9 Super Programs In This Issue!

September 1989

Readers Jam the Flames in 64 vs. Nintendo Debate!

COMPUTE!'s GAZETTE™ FOR USERS

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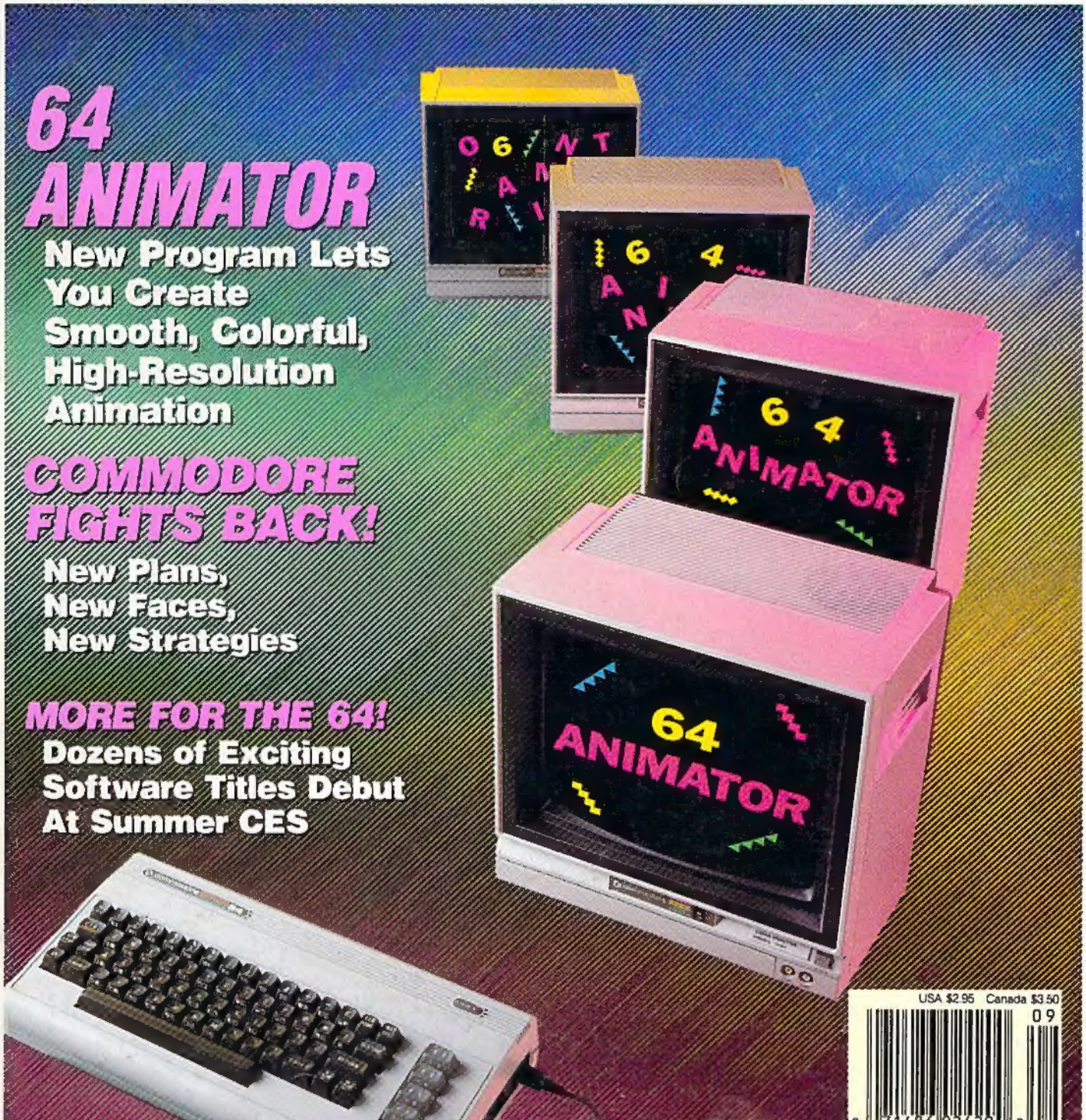
COMMODORE 64/128



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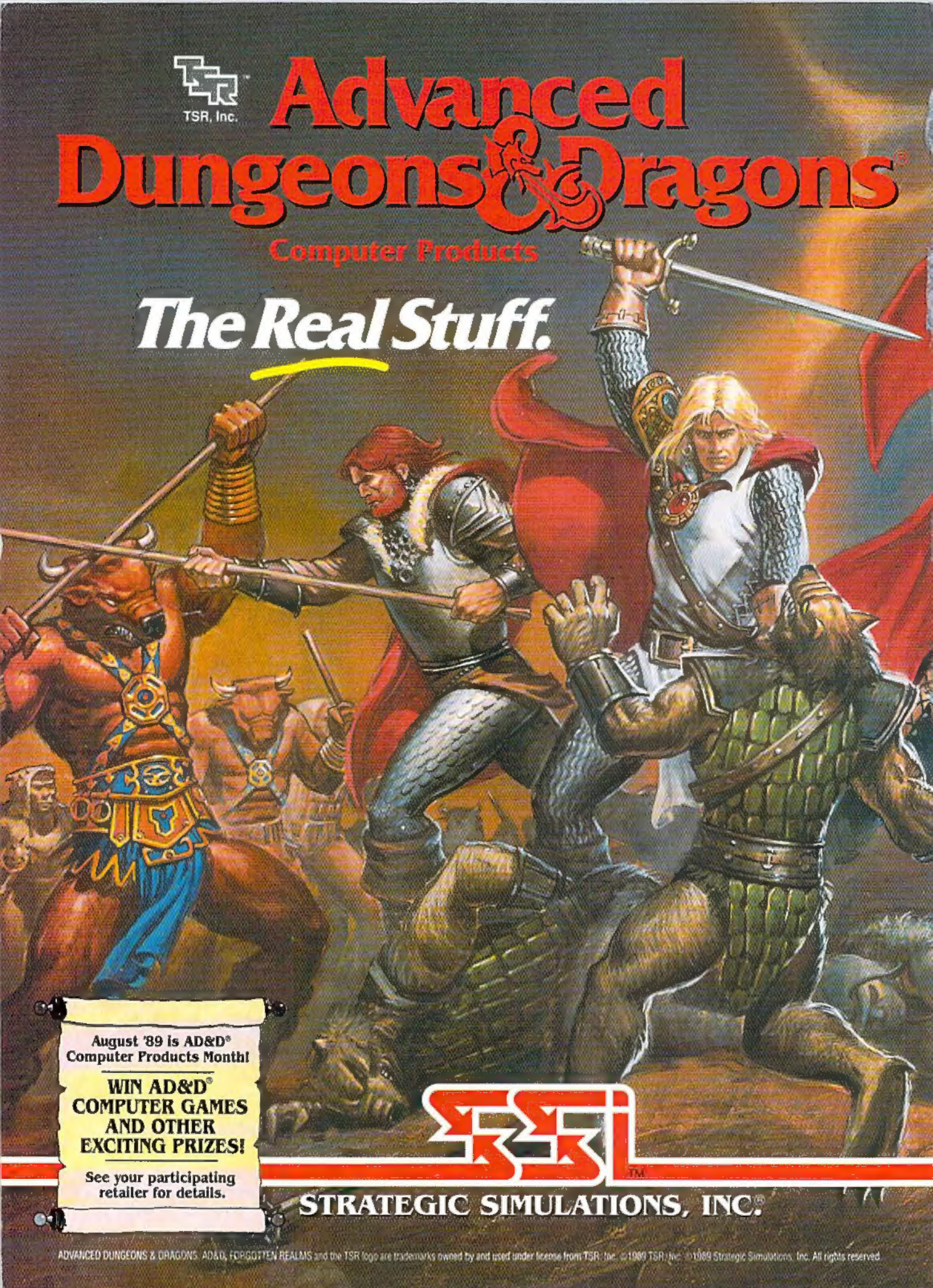

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GAZETTE contents

September 1989 Vol. 7, No. 9

Features

Who Ya Gonna Call? Your Commodore User Group
Tom Netsel ..... 10 *

About Face! Commodore's Back in the Classroom
Mickey McLean ..... 14 *

Reviews

Last Ninja 2
Steve Hedrick 31 64

Keith Van Eron's Pro Soccer
Neil Randall 31 64

Word Writer 4
Robert Bixby 32 64

Tower Toppler
Robin Minnick 34 64

Demon's Winter
Erik Olson 36 64

Combat Course
Dan Wilson 37 64

Games

Block Battle!
Jon Dearden 20 64

Wham Ball
Rick Bauer 22 64

Programming

Memo Card
William Chin 24 64

64 Animator
Hubert Cross 28 64

SpeedScript 128 Plus
Michael Gruber 38 128

EZ Bar Charter
Tim Ruiz ..... 48 128/64/+4/16

MR Scribble
John Fedor 50 64

BASIC for Beginners: Nintendo vs. 64—Another View
Larry Cotton ..... 54 *

The Programmer's Page: 128 Tips
Randy Thompson 58 128

Machine Language Programming: Powers of 2
Jim Butterfield 60 128/64

Power BASIC: On the Border
Shao-Tien Pan 70 64

Departments

Editor's Notes
Lance Elko ..... 4 *

Letters to the Editor ..... 5 *

Commodore Clips: News, Notes, and New Products
Mickey McLean ..... 6 *

Feedback
Editors and Readers ..... 52 *

D'Iversions: Commodore vs. Nintendo— What's Your Opinion?
Fred D'Ignazio ..... 62 *

Horizons: Merci, Berkeley
Rhett Anderson ..... 64 *

User Group Update
Mickey McLean ..... 66 *

The GEOS Column: SlideShow
John Stabile 68 128/64

Program Listings

MLX: Machine Language Entry Program for Commodore 64 and 128 ..... 72 128/64

The Automatic Proofreader ..... 78 128/64/+4/16

How to Type In *COMPUTE!'s Gazette* Programs ..... 96 *

***COMPUTE!'s Gazette* Author's Guide** 71 *

Advertisers Index 79

64 = Commodore 64, **+4** = Plus/4, **16** = Commodore 16, **128** = Commodore 128, * = General

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EDITOR'S notes

A couple of years ago, Apple Computer extended the life of its Apple II line by introducing the IIGS. This machine, so named for its enhanced graphics and sound (thus, the letters *GS*), has sold fairly well to schools, thanks to Apple's educational discounts, but has not exactly been the hot item in the consumer market. Will Commodore take the same tack?

The latest rumor says *Yes*. We've heard reports from several sources of a new machine from Commodore—a 64GS, if you will. This machine is reportedly driven by a GE802, a version of the 65816 microprocessor (which is a 16-bit version of the 6502 chip), and runs at 4 MHz (by comparison, the 64 runs at 1 MHz; the Amiga, at slightly over 7 MHz). It comes with 128K of RAM and is expandable to one megabyte. Fully expanded, it supports 256 colors. Maximum resolution is a stunning 640 × 400 pixels. We've also heard that it has a 64 mode so that 64 owners can purchase a much more powerful machine and still use their software library. The 64GS reportedly comes with a built-in 3½-inch disk drive and will support the 1581. But, our sources say, it does not support the 1541 or the 1571 drive (uh, excuse me, pass the bologna). All we've heard about sound in the new machine is that it's "enhanced" and features stereo output. The final tidbit is that the 64GS will retail in the $300–$350 range when it debuts in November.

Our sources also report that there is a great deal of infighting at Commodore as to whether the machine should be released. The sales staff wants to get the machine out the door, while the naysaying engineers have dubbed it "son of Plus/4." Regardless of the decision the Commodore execs make, it's clear as to what's on their minds. Sales of the 64 have diminished rapidly, Nintendo has eaten big holes in the market, and the life of the old warhorse computer should somehow be extended. In view of Commodore's recent single-minded and intensified focus on the Amiga, all of this is an odd bit of news.

I can't help but be reminded of returning from CES in January 1985 and writing a CES story (April 1985 *Gazette*) that included coverage of Commodore's $600 LCD laptop. We even ran specs and photos with the story. The machine never appeared. (Excuse me, I'll have some more of that, uh, bologna.)

A special thanks to our sources. (And a tip of the hat to Rhett Anderson, who prophesied such a machine in his June "Horizons" column.) Next month, we promise to have more news on the bewildering but fascinating saga of Commodore's latest exploits.

Lance Elko
Associate Publisher/Editorial

COMPUTE!'s GAZETTE FOR USERS
COMMODORE 64/128

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LETTERS to the editor

Send questions or comments to Letters to the Editor, COMPUTE!'s Gazette, P.O. Box 5406, Greensboro, North Carolina 27403. We reserve the right to edit letters for clarity and length.

Creative Connection

In his article "Make It Sing!" (July), Art Hunkins commented on the apparent difficulty of connecting the 64/128 audio output to a hi-fi system when using a 1902A monitor. He indicated that a special cable would have to be made in order to accomplish this. Actually, there is a much simpler solution which may sound strange, but it works for me.

In addition to the DIN jack, the 1902A also has separate audio and video input jacks. With the DIN cable connected as usual, the audio *in* jack may be used as an output instead. A standard RCA cable (with plugs at both ends) may be plugged into this jack and used the same way that the audio lead on a normal monitor cable would be used. The connection to the hi-fi system is made as Mr. Hunkins describes, except that the RCA cable has a plug on each end and is plugged into the 1902A's *audio in* jack instead of the nonexistent audio lead on the monitor cable.

Joe Lippl
Hopkins, MN

The Kid Knows His Keyboard

The child notices things that the adult doesn't in your article "Make It Sing!" (July). You mentioned the Casio MT-240 (the keyboard I received for Christmas). First, you said it has a particularly good piano sound. The piano sound on this keyboard is equal to those of some of the more expensive keyboards. It lacks only the amount of keys found on true pianos. You also stated that the MT-240 has 199 other sounds (making a total of 200). It really has 209 other sounds (for a total of 210). The tone bank lets you mix sounds. Next, you stated that it has no headphone jack. Actually, it's there, disguised as a 30-ohm output jack. Seeing that my headphones fit in this jack, I decided to see if it worked. It did! My only other complaint is your comment about it lacking polytimbral (I used a dictionary) capabilities. This feature is there, labeled as *multi-split percussion*. As a matter of fact, the words *multi-split percussion* and *210 tone sound bank* are written on the button panel of the keyboard. Last, you stated that most keyboards have mono output, but you failed to note that the MT-240 has full stereo. I hope that by revealing these errors, more people will save money and buy the inexpensive MT-240.

Your 11-year-old subscriber,
David Ross
Wheeling, IL

G

ARCADE MACHINE CONTEST WINNERS

In our February 1989 issue, we announced a contest, "*Gazette*'s Great Arcade Machine Challenge." Readers were asked to send in a game they created with "The Great Arcade Machine," a complete game-design program published in the same issue. We received many excellent games, and selecting winners was no easy task. Without further ado, here are the winners.

FIRST PRIZE—$200

Freak Attack
Kevin Messerschmidt, Long Beach, CA
You're the only citizen brave enough to defend your own town against invasion by mutant aliens. Well-designed graphics, great animation, and excellent playability make Freak Attack our first-prize winner.

RUNNERS-UP—$50 each

Neverest
Robert J. Olsen, Lanham, MD
Deep in the mountain of Neverest, nuclear missiles are being built for use against your nation. Blast the mountain and destroy the base before the rockets reach your homeland.

Rescue Pod
Gary M. Perdue, Camden, AR
Several fellow astronauts are stranded after crashing into a nearby planet. Cross the treacherous asteroid belt and return the survivors to the mother ship while avoiding the whirling asteroids.

Egg Beaters
Keith M. Groce, Bremerton, WA
You jump out of bed, ready for your favorite breakfast: scrambled eggs. After opening the fridge, it appears that some of the eggs are a bit strange, even possessed. Egads! Deviled eggs! Determined to eat, you try to scramble the good eggs while avoiding the bad ones in this arcade nightmare.

Blast-Off
Clay Hellman, Calgary, Canada
Survive the aliens in all 12 levels in order to save the galaxy. "Blast-Off" utilizes redefined multicolor characters to produce realistic background scenery. Enemies abound in this classic shoot-'em-up space game.

SPECIAL DISK OFFER!
As a bonus on this month's *Gazette* companion disk, we've included all five winning programs. (Sorry, we don't have the space to print the listings in the magazine.) This special one-time offer brings you the nine programs in this issue, plus the five contest winners for $10 (including postage and handling), $5 less than our normal single-copy price.

To order, send a check or money order for $10 to Gazette Bonus Offer, P.O. Box 5188, Greensboro, North Carolina 27403. *Note: Shipping and handling is included for all U.S. and Canadian residents. Others add $1 for surface mail or $3 for air mail. Payments must be in U.S. dollars by check drawn on a U.S. bank. North Carolina, New York, and Pennsylvania residents must add appropriate state sales tax.*

COMMODORE CLIPS

NEWS, NOTES, AND NEW PRODUCTS

Edited by Mickey McLean

Summer CES: Here Comes More for the 64

This past summer's Consumer Electronics Show featured announcements of several new entertainment packages for the 64.

Electronic Arts (1820 Gateway Drive, San Mateo, California 94404) presented its list of titles to be released this fall, many already available for other formats. Heading the list is the long-anticipated *John Madden Football*, followed by *Kings of the Beach Professional Beach Volleyball*, *Ferrari Formula One*, *Starflight*, and *Sentinel Worlds I: Future Magic*.

Big-name sports stars continue to sign with Virgin Mastertronic (711 West 17th Street, Suite G9, Costa Mesa, California 92627) to endorse its computer games. L.A. Dodger pitcher Orel Hershiser, U.S. World Cup Soccer team captain Rick Davis, and professional golfer Greg Norman join Magic Johnson and John Elway in Virgin's lineup of endorsers.

Hershiser will lend his name to *Orel Hershiser's Strike Zone*, based on the coin-operated baseball game *Strike Zone*, while Davis' name will appear

Snow Strike from Epyx

Purple Saturn Day from Epyx

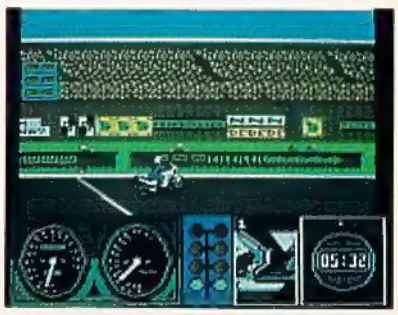
on *Rick Davis' World Trophy Soccer*. Greg Norman, a.k.a. the Great White Shark, inspired *Shark Attack: Greg Norman's Ultimate Golf*. All three titles are scheduled for release later this year.

Brøderbund (17 Paul Drive, San Rafael, California 94903-2101) and affiliate label Domark announced the fall release of *Licence to Kill*, based on the latest James Bond film. You become agent 007 as you fight on land, on the sea, and in the air to defeat a powerful drug lord.

Among the new releases from Epyx (600 Galveston Drive, P.O. Box 8020, Redwood City, California 94063) are *Revenge of Defender*, the sequel to the classic *Defender*; *Purple Saturn Day*, an intergalactic Olympic-style competition featuring seven alien athletes and one earthling who battle on the ringed planet; and *Snow Strike*, an action game in which you become a U.S. fighter pilot on a top-secret mission to destroy the fields, refineries, and seagoing transport of South American drug lords.

From Capcom U.S.A. (3303 Scott Boulevard, Santa Clara, California 95054) comes a fantasy adventure, *Black Tiger*; the arcade-converted *Cabel*; a space adventure, *Forgotten Worlds*; a *Ghosts 'n' Goblins* sequel, *Ghouls and Ghosts*; a World War I biplane battle, *1918: Hunt for the Flying Circus*; a motorcycle simulation, *Pocket Rockets* (previewed in this column last month); a futuristic space adventure, *Side Arms*; and an arcade adventure, *Strider*.

Mindscape (3444 Dundee Road, Northbrook, Illinois 60062) announced the release of three new titles for the 64. *Gauntlet II* has been



Pocket Rockets from Capcom

converted from the coin-op version, while *After Burner*, another coin-op conversion, allows you to pilot an F-14 Tomcat through a variety of rescue missions. You can become a master ninja in *Shinobi*, the third 64 release from Mindscape.

Look for more details about these products in upcoming "Commodore Clips" columns.

From Arcades... to Campuses... to the Movies

Taito Software (267 West Esplanade, Suite 206, North Vancouver, British Columbia, Canada V7M 1A5) has announced the release of three new software titles for the Commodore 64.

Taito's original coin-operated outer-space hit, *Arkanoid*, now has a sequel. A one- or two-player game, *Arkanoid II, the Revenge of Doh* ($29.95), puts you in command of a maneuverable spacecraft trying to destroy an evil force lurking in a large alien spaceship. You must penetrate and break down 67 energy barriers by deflecting multiple energy balls.

Qix ($29.95), a popular arcade game on college campuses, is now available for the 64. This game of mental dexterity and strategy takes you on an electrically charged world of roving sparks and waves of energy, both of which must be avoided.

Taito's third announced title, *Rambo III* ($29.95), is a role-playing adventure based on the film starring Sylvester Stallone. You must possess problem-solving and strategy skills on your mission to free Colonel Trautman from a heavily guarded fortress on a desolate Asian landscape.

COMMODORE CLIPS

NEWS, NOTES, AND NEW PRODUCTS

The Family That Computes Together...

In an effort to meet family computing needs, Brøderbund Software (17 Paul Drive, San Rafael, California 94903-2101) has released *The Family Software Library* ($69.95) which contains three programs in one package: *Bank Street Writer, Type!,* and *Where in Europe Is Carmen Sandiego?*. Brøderbund is marketing the package as a starter kit for families that have just purchased a new computer.

You and members of your family can learn basic typing skills with *Type!,* a program that includes special exercises for children and an arcade game that teaches typing as you play. *Bank Street Writer* is a word processor designed for home use by both children and adults. *Where in Europe Is Carmen Sandiego?* teaches thinking skills while you absorb facts about geography, history, and culture. You assume the role of detective in search of the notorious Carmen Sandiego and her gang of master thieves as they make their way across Europe.

The package comes with a Parent's Guide that features ideas on family activities that can get the most out of the three programs.

Accolades for Accolade

The Third Annual Game Developer's conference in Sunnyvale, California, has named Accolade (550 South Winchester Boulevard, Suite 200, San Jose, California) Best Publisher, Best Producer, and Runner-up, Best Producer.

One of the two awards presented for Best Producer went to Shelley Day, producer of the driving simulation *Test Drive.* Sam Nelson, who produced *Steel Thunder, TKO,* and *Jack Nicklaus' Greatest 18 Holes of Major Championship Golf,* tied for the award of Runner-Up, Best Producer.

The Envelope, Please

The Software Publishers Association has announced the winners of the 1988 SPA Excellence in Software Awards, and two of the big winners were Spectrum HoloByte and Brøderbund.

Spectrum HoloByte's *Tetris,* the first computer game from Russia, captured awards for Best Entertainment Program, Best Action/Strategy Program, Best Original Game Achievement, and the Critic's Choice Award for Best Consumer Software.

Brøderbund's *Where in Europe Is Carmen Sandiego?* took top honors for Best Home Learning Program and Best Social Studies/Science Program.

MicroProse, now MPS Technologies, also took home the Best Simulation Program award for *F-19 Stealth Fighter.*

Best Creativity Program for an Educational Product was awarded to *Hometown, U.S.A.* by Publishing International.

Attack by Tank

One to four players can command tanks on the battlefield with *Tank Attack* ($24.95) from Artworx (1844 Penfield Road, Penfield, New York 14526). The program combines a strategic board game with the realtime play action of the computer.

Each player assumes the role of the commanding General of a country's tank corps. The final objective is to capture the enemy's headquarters, which requires planned strategic deployment of your forces and battles against enemy units. The computer issues all movement orders, battle results, the status of each unit, and a daily newspaper that gives a full report on each day's fighting along with a weather forecast for the next day. You can also form alliances with other players before war is declared.

The game comes with a playing board, 48 plastic vehicles, the program disk, and an instruction booklet. ▷

COMMODORE CLIPS

NEWS, NOTES, AND NEW PRODUCTS

Lucasfilm Moves to EA...

All Lucasfilm Games (P.O. Box 10307, San Rafael, California 94912) entertainment software titles are now distributed in North America by Electronic Arts. Under this affiliated publishing relationship, Lucasfilm will be responsible for product development and marketing, while EA will be responsible for sales and distribution.

EA now provides domestic distribution of games such as *Maniac Mansion* and *Zak McKracken and the Alien Mindbenders*. Previously, Lucasfilm Games titles were distributed by Mediagenic.

...And So Does New World

Electronic Arts has announced that New World Computing has joined its Affiliated Label program. New World is best known for the fantasy role-playing adventures, *Might and Magic I* and *II*.

Based in Van Nuys, California, New World was founded in 1984 by president and software designer Jon Van Caneghem. *Might and Magic I* was released in 1987 and sold over 100,000 units (Certified SPA Gold). *Might and Magic Book II: Gates to Another World* ($39.95) was released this summer.

New World had been distributed by Mediagenic for the past two years.

More Reading for the Accelerated

Two new optional supplemental disks for the Accelerated Reader reading enrichment program from Readup (P.O. Box 95, Port Edwards, Wisconsin 54469) have recently been released.

Diskette 251-300 ($50) features titles such as *Einstein Anderson, Science Sleuth; Hello, My Name Is Scrambled Eggs;* and *Ramona the Brave*. Titles on *Diskette 301-350* ($50) include *The Secret Life of Dilly McBean; The Friendship; Oliver Dibbs and the Dinosaur Cause;* and *Eating Ice Cream with a Werewolf*.

Like the first three supplemental disks, the two new disks contain tests for 50 books. With the *Accelerated Reader*, students select a book from the list, read it, and then test themselves on comprehension with the computer program. It then scores the tests and accumulates results for each child and for the class as a whole. The list of 400 books ranges from easy titles to adult-level books, including many classics. New titles and test questions can be entered by teachers.

The complete *Accelerated Reader* package contains the program and backup disks, four testing disks, a wall chart, and a manual. It sells for $300.

Hey, Pal!

The television series may have run its course, but fans can live out further adventures of Crockett and Tubbs with the new interactive arcade-style game, *Miami Vice* ($29.95) from the Miami-based software publisher, IntraCorp (14160 Southwest 139th Court, Miami, Florida 33186).

The game, available on IntraCorp's Capstone label, offers eight levels of action, including a car chase featuring Crockett's Ferrari, a speedboat race, and a search of a waterfront warehouse for an illegal shipment. The show's tropical backdrop is translated into colorful computer graphics.

Dark Clouds Are Gathering

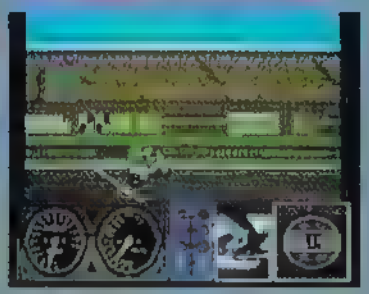
Relive every facet of World War II in Europe with *Storm Across Europe* ($59.95) from Strategic Simulations (675 Almanor Avenue, Sunnyvale, California 94086). This strategic-level game encompasses the entire conflict in Europe from 1939 to 1945.

Up to three players can control the action while the computer controls either the Allies and/or the Russians. Armies can move to conquer territories and attempt to make amphibious landings. You can also launch U-boat campaigns in the Atlantic and carry out strategic bombing strikes against enemy production centers. Other features include multiple scenarios and the ability to change starting levels for each country, which allows for many variations of gameplay.

SSI games are distributed by Electronic Arts.

Storm Across Europe from SSI

SANTA CLAUS IS COMING TO TOWN



this year's rounds faster than ever. And

Pocket Rockets lets you choose from

on the planet. The action's as real as the adrenaline you'll feel.

Then, enter "Santa's Sleigh Giveaway" from Capcom U.S.A. Besides the chance to win a new Suzuki motorcycle, you could get a

to enter in all

game package

orite computer gam

more information. Capcom's belated Christmas giveaway is just around the bend so don't miss out on your chance to win!

POCKET ROCKETS

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CAPCOM USA

Who Ya Gonna Call?

Your Commodore User Group

From Venice, Florida, to Sitka, Alaska, more than 400 Commodore user groups offer 64 and 128 owners a wealth of information and services—all designed to help you get the most out of your computer.

Tom Netsel

Illustration by Harry Blair

When you have a question about your 64 or 128, a Commodore user group can be your closest and best source of computer information. So, when you've got a computer problem—to borrow a line from a hit movie—who ya gonna call?

No, not those guys. The answer is *your user group.*

Through meetings, demonstrations, question-and-answer sessions, special interest groups (SIGs), electronic bulletin boards, newsletters, and individual help, a user group can be an invaluable educational resource for any Commodore owner.

While organizations vary, the Scottsboro (Alabama) Commodore User Group (SCUG) is typical of many active groups. A family membership is $25 the first year and $15 per year thereafter. About 50 families participate in the group's activities.

SCUG, which began more than five years ago, meets on the second Tuesday of each month at Page Elementary School. The doors usually open at 6:30 p.m., with meetings scheduled for 7:00. Club officers and SIG leaders try to arrive early to answer questions and greet members.

These volunteers also set up tables for various SIGs, including the club library. Jeremy Rousseau, the 64/128 librarian, has more than 300 public domain disks that members may borrow and copy. A set of four directory disks lists all the titles and helps members locate programs they want. Rousseau keeps the directory up-to-date by adding the titles of new acquisitions. Included in the library are 58 educational disks covering a range of subjects for kindergarten to college levels.

The Scottsboro group has a close working relationship with the local school system and its computer instruction programs. "In our first official meeting," says SCUG president Richard Radon, "we voted to make every teacher of the Scottsboro City School System an honorary member of our club." Many of the schools use 64s, and teachers are encouraged to take advantage of the club's disk library. The group has donated more than 300 disks to the city's four elementary schools and has bought them more than $350 worth of commercial software.

A Newcomers Table at user group meetings provides information about SCUG membership, its resources, and activities. After joining the club, members are given a disk that contains general information about the club and the membership, along with reviews. The disk, which can be read on a monitor, is useful to new SCUG members.

The Bargain Table offers 64 and 128 hardware and original software for sale or trade. The Mail Table features newsletters from other user groups, advertisements, computer catalogs, and other items of interest that the group or individual members have received. Members buy, swap, and sell back issues of computer magazines at the Magazine Table.

Leaders of the different SIGs each have their own tables. If a member has a particular question about hardware, database programs, GEOS, or programming, volunteers at these tables are ready to help. Should a tough question stump these experts, the group hasn't exhausted its resources. There's still more help to be found at the Guru Table.

The gurus are dedicated members who have expertise in different areas of computing. These members cut their collective teeth on KIMs, PETs, and VIC-20s. There are few things about Commodore computers that they don't know. Many user groups have their own gurus who are willing to help members with particular problems.

Need some computer paper or blank disks? The club buys large quantities, adds a small markup, and then sells supplies to its members. Profits go into the general fund for club activities.

SCUG meetings begin with a short business session, followed by a ten-minute intermission. During the intermission, members can visit various tables, ask questions, and arrange for later help. Radon says he has invited 80 percent of the group's members to his house for individual help sessions. Following the ten-minute break, SIG leaders start their sessions, demonstrations, or tutorials. ▷

Who Ya Gonna Call?

A recent SIG led by Ken Bernitt focused on BASIC programming. Bernitt, a school-system computer teacher who donates his services, opened the series of free classes to the public. For members already familiar with BASIC, Mark Thomas offered a tutorial in machine language programming Jim Watson leads a SIG for those interested in the Amiga.

"We are blessed to have leadership that is versatile and willing to alter the interest-group format to fit the needs of the group," Radon says. New members are not forgotten in all the activities. Radon talks with and welcomes them at each meeting. SIGs for beginners teach them about formatting disks and loading and saving programs. If a family has younger members, vice president Deborah Drennen meets with them.

"The officers and leaders of our club make it a point to help new computer owners," Radon says. "We try in all training sessions to structure activities to begin at the most basic level so as not to drive away greenhorn users. The new users are the leaders of next year's club. Any club leadership that forgets new users is one destined to fail."

The activities of the Scottsboro group are typical of many user groups, but activities don't stop when a meeting adjourns. An active user group, like SCUG, provides its members and its community with a variety of educational opportunities.

Computer Fairs

Last year, the Washington Area Commodore User Group (WAC) sponsored its first fair. This one-day event, which attracted about 1500 people, featured a retail sales floor, a user group center, and educational seminars.

Seminar titles included Commodore 64 Fundamentals, Commodore 128 Fundamentals, A Parents' Guide to Educational Software (Grades K–8), and 64/128 Word Processing Other topics included telecommunications, programming in BASIC, COMAL programming, and GEOS fundamentals. There were also programs for Amiga users. Seminars were conducted by experts from the nine user groups in the Washington, D.C., area.

"The fair was enjoyable, financially successful, and a definite attraction for persons to join user groups in the metro area," says WAC member John Krout.

Twice a year in Saginaw, Michigan, a major mall sponsors a Community Affairs Weekend. The Saginaw Area Commodore User Group attends, with members working shifts throughout the weekend, according to group President Gilbert Bernier. "This event adds strength to our membership by attracting new members and educates the public to the fact that user groups are out there to help them with that Commodore purchase they made and could never figure out."

Computer fairs are popular in Port Orchard, Washington, where the University Place Commodore Home User Group holds its annual event in October. In Wyoming, the Cheyenne Association of Computer Enthusiasts (CACE) holds a software fair in August. "We demonstrate some of the capabilities of a small computer or just let the public try a demo or game," says CACE member Bob Wilhelm.

> *"The user group. . . sometimes is your only hope for help."*
>
> —Richard Radon, Scottsboro User Group

The Catalina Commodore Computer Club in Tucson, Arizona, holds what it calls Saturday Help Days. "People of all ages get together to teach or learn, to solve problems, and just talk computers," says the group's vice president and newsletter editor Leila Joiner. Volunteers conduct classes from 10:00 a.m. to 2:00 p.m. every third Saturday, covering everything from cleaning a keyboard to using a modem. There are SID demonstrations, word processor classes, animation programs, and games for people to try. "Those who learn the most are the ones who volunteer to teach others," Joiner says.

The Commodore Association of the South East (CASE), with headquarters in Clarksville, Tennessee, may be thought of as a user group for user groups. It is a consortium of approximately 35 user groups that represent more than 4000 Commodore owners. It sponsors its own fair.

On September 16 and 17, the fourth annual CASE Show will be held at the Nashville Civic Center. This year's show will highlight several speakers known to most Commodore owners They will include Jim Butterfield, renowned Commodore authority and *Gazette* columnist; R. J. Mical, a member of the original Los Gatos Amiga development team, now with Epyx; and Jim Oldfield of legendary *Midnite Gazette* fame, now with Abacus. Topics of interest will include MIDI, desktop publishing, adventure games, and beginner orientation. More than 35 vendors will offer hardware and software at bargain prices. (For more information, write to CASE, P.O. Box 2745, Clarksville, Tennessee 37042-2745.)

Video

It's impossible for users to attend every computer fair, much less sit in on every seminar. Groups aware of the problem now videotape their events. CASE plans to tape all of its seminars at the September fair and make them available to affiliated clubs. Its video library will also include software demonstrations. Software publishers such as Epyx often provide tape demonstrations of new products to retailers, who may lend them to user groups.

WAC members videotaped seminars at the Washington Area Commodore Fair, and they plan to use the medium in other areas as well. A Beginners' Day held twice a year addresses such questions as *What is a disk? Why are disks required? How can information be stored and retrieved? How can disks be damaged, protected, and prepared?* WAC plans to videotape the answers to these questions.

"For every expert, there are still 20 or more novices," says WAC's John Krout. "As novices come to the club, they ask the same questions." Instead of answering these same questions at every meeting and running the risk of boring veteran members, WAC's video of basic computer information should do the trick

"We lend videos to members for a month at a time," Krout says. "If novices can use a VCR, then they can repeat a thorough educational experience as often as desired. If this proves to be popular, we'll try to videotape every SIG meeting."

Krout offers some advice to groups planning to make their own video demonstrations. For best quality, videos of a speaker require bright lights and a microphone close to or worn by the speaker. Videos of a computer demonstration are somewhat easier to produce and can be made without a camera by sending the computer's composite video output directly to a VCR's video-in jack. Portable VCRs often have a jack for a microphone to record the demonstrator's commentary. In this way you have a recording of what's happening on the computer screen and what the demonstrator is saying.

Unlike computers, consumer VCRs are not perfect copying machines Each copy introduces video noise to the program. If your group plans to make copies of its videos, try to find someone at a local TV or cable operation or someone who has access to commercial VCR equipment to make the duplicates.

Newsletters

While videos may be the rookie in a user group's educational arsenal, the printed page is the veteran. Practically every user group issues some form of newsletter, whether it's a single sheet or a multipage publication with photographs. Newsletters offer user group members another source of invaluable computer information.

Local club news, software reviews, programming tips, and lists of upcoming events are just a few of the topics covered in a typical publication. Volunteer editors spend hours each month compiling their publications. Articles come from a group's own members, some are downloaded from information services such as Quan tumLink, and others come from other newsletters.

In a recent edition of "Floppy News," the newsletter of the Central Florida Commodore Users Club, there was an article by Joseph F. Fenn about the GEnie information service. Fenn's article was credited to the Commodore Hawaii User Group's newsletter.

Shirley Tapley, a member of the Commodore Technical User Group in Costa Mesa, California, had several hints and tips published in the Scottsboro, Alabama, newsletter. Among the items printed, Tapley suggested that 128 users try this one: POKE 54784,9: POKE 54785,232 to get a clearer, cleaner screen image, increasing resolution. Newsletters often contain dozens of similar tips for the 64 and 128. A well-written newsletter is often worth the price of a user group membership.

Unfortunately, not every user group publishes a thick, informative newsletter. It's still possible to receive a fact-filled newsletter even if you don't belong to a user group. Grant Willey is the editor of "The Commodore U.S.A. Club," a newsletter aimed at Commodore owners across the country.

This monthly newsletter prints reviews, tips, and programming hints. There's a GEOS column, a Commodore column, classified ads, and more. The unusual feature about Willey's newsletter is his publication policy. "All submissions made by the members are guaranteed to be published," he says. "Members are also free to be the editor of their own column in the newsletter. It's a great way to get experience in desktop publishing."

In its subscription, this nonprofit organization includes a bimonthly bonus disk containing games, utilities, word processors, and similar programs submitted by readers. (For more information about "The Commodore U.S.A. Club," write in care of Route 2, Box 329, Delmar, Delaware 19940.)

Combining a disk with a publication is not a new concept, but the University Place Commodore Home Users Group (UPCHUG) in Washington produces a newsletter that alternates monthly between hardcopy and disk. Bob Purtzer edits the printed version, and Jim McFarland handles the editing chores on the disk.

"The disk newsletter usually includes some software, ranging from public domain graphics for *Print Shop*, printer utilities, shareware, and public domain programs," says UPCHUG president David Ockrassa. "Both versions have been running a series of articles on different programming languages."

> *"For every expert, there are still 20 or more novices."*
>
> —John Krout, Washington User Group

Other Services

Parents with small children are often reluctant to take their youngsters to meetings. Babysitters aren't always available, and children get bored sitting through long meetings. To encourage such members to attend, the El Paso (Texas) Commodore User Group provides a separate computer setup with games to entertain children of members and visitors. "They enjoy it and it allows members to attend who otherwise couldn't because of a lack of babysitters," says EPCUG president Blaine Snyder.

Electronic bulletin board systems (BBS) represent yet another service many user groups provide. Most boards are open to anyone with a computer and modem, although some sections may be reserved for user group members.

The New London County Commodore User Group in Groton, Connecticut, has two members who run BBSs on 128s with 1581 and 1571 disk drives. "These boards both have special message bases just for the NLCCUG members," says the group's membership chairman Michael LaRose, "and a technical message base for questions and answers on Commodore computers and associated hardware."

User group officers and members donate their time and talents to help others get more enjoyment out of their 64s and 128s, but some volunteers don't stop with the meetings. Thomas May, a member of the Commodore Computer Club of Jacksonville, Florida, shares his computer knowledge with children in a special education class at Thomas Jefferson Grade School.

May started by helping the school with its collection of public domain software. One day, the principal asked May if he would take four students to the school's computer lab and teach them how to use a computer. The experiment worked, and now May holds class once a week. The school has several brands of computers available, but May often takes his 64 and 128 with him. "Dollar for dollar, the 64 is hard to beat," he says.

One computer has a math game running; the other, an arcade-style game. The children have their own disks they've formatted, and they save their programs and lessons. After some time with the math lessons, the children rotate to the game machine as a reward. "The special education teachers run the show," May says. "I supply the programs and computers and stand by to help."

Share the Knowledge

Standing by to help—that could be the motto of most user groups. When you get stuck with a program, your printer refuses to work with a new word processor, or some other computer gremlin pops up, help is usually as close as your nearest user group. As Richard Radon says, "The user group or friends sometimes are your only hope for help. Our user group's purpose is the sharing of information and knowledge about the use of the Commodore. We were all first-graders to computers at one time, . . . but we all can learn by sharing our limited knowledge. Get involved."

In order for user groups to continue as prime sources of information for Commodore users, 64 and 128 owners need to get involved. According to a recent survey of *Gazette* readers, only 30 percent are members of a user group. Getting involved and participating with your local group is the only way it can grow. Whether you're a computer novice or a guru, being part of your local user group is an educational experience you shouldn't miss. And you can't help but grow yourself. G

ABOUT FACE!

Commodore's Back in the Classroom

Commodore once had its foot in the door of schools around the country, but it pulled out of classrooms to zero in on the home market. After losing ground to Apple and IBM, Commodore is back with a renewed commitment and new faces.

Mickey McLean

If you can't beat 'em, hire 'em. Remember Commodore as a contender for the top spot in the education marketplace? You have a good memory. It's been years since the 64 was taken seriously in the classroom, losing its place to Apple IIs and MS-DOS machines. To reverse this trend, the company recently hired two former Apple Computer employees who have big plans for the decade ahead.

Last spring, Harold Copperman was named president and chief operating officer of Commodore's U.S. operations. Before joining Commodore, Copperman was vice president and general manager of Apple's Eastern Operations. Prior to that, he spent 20 years with the other major player in the education market, IBM, finishing his stint with Big Blue as national director of marketing for IBM's Academic Information Systems Business Unit.

Copperman brought in Howard Diamond, one of his former co-workers at Apple, to become Commodore's education director. Diamond was responsible for education programs for Apple's East Coast division and had previously spent 16 years in computer development at the University of Illinois. Diamond joins education manager John DiLullo, who started work at Commodore in the fall of 1988, to form a team which will eventually include other education experts.

"Commodore used to be a leader in education," Diamond said. "In the last year, Commodore has refocused on education, and we plan to make a major push both in K through 12 and in higher education."

Advisory Board

"I think Harold Copperman is definitely committed to the educational marketplace," said Jan Davidson, head of the veteran educational software house Davidson and Associates and a member of the Commodore Education Advisory Board.

Davidson also believes that the presence of Howard Diamond should be another plus for Commodore. "He knows he has his work cut out for him," she said, "but he is really committed and has been involved in education all his life."

Before Copperman and Diamond came on board, Commodore began its quest to recapture the education market by creating the Commodore Education Advisory Board. In addition to Davidson, the group is made up of education professionals including administrators, teachers, journalists, and a retailer. The group met for the first time in January.

The board reconvened in June, with Copperman assuming the leadership role. Diamond had also joined the company just one day prior to the meetings in Tucson, Arizona. The group plans a 1989 wrap-up meeting this fall.

Trying to Meet All Needs

When hired, Copperman said he plans to "take advantage of Commodore's broad range of products to further penetrate the education market."

In other words, Commodore is attempting to be all things to all people in the education marketplace. With the 64 and its large installed base, Commodore offers a low-cost computer for elementary schools. The MS-DOS line provides a low-cost alternative to IBM PCs and compatibles, while the graphically strong Amigas represent an inexpensive alternative to the Macintosh and is what Commodore hopes will become the education machine of the future.

The Commodore Educational Advisory Board and members of Commodore's education marketing staff: L to R, John DiLullo, Commodore Education Manager; Howard Diamond, Commodore Education Director; Diane Otteson; David Archambault, Commodore Director of Project Marketing; Roy Strauss, Commodore Interactive Video Product Manager; Lilly Toback; Marty McClain; Ken Brumbaugh, Commodore Education Consultant; Jenelle Leonard; Jim St. Lawrence; Eydie Sloan; James Mecklenburger; Jan Davidson; James Poirot.

"We have to commit to the Amiga," DiLullo said. "When people see what the Amiga can do in education with video, art, and graphics, they'll see that it is unchallenged at any price."

But where does that leave the 64 in the world of education?

"It's clear that there is a big established base of 64s," Diamond

ABOUT FACE

said. "Our support of the 64 is a critical issue. A lot of users have made an investment and we can't afford to walk away from that."

DiLullo added, "We want to know where they [64 users] are and let them know we are here and interested in education."

Making Up for the Past

Jenelle Leonard, director of the Computer Literacy Training Laboratory for District of Columbia Schools, acts as an observer to the Advisory Board. The D.C. schools have 640 Commodore 64s out of over 4000 computers in use, which makes her an interested as well as a well-informed observer.

"Commodore wants to regain their [64 users'] confidence and keep them apprised of current software and hardware improvements," Leonard said. "Commodore is going to have to put in a lot of effort to come back into the education arena."

Davidson agrees. "They need to get out and make their commitment to the education marketplace clear and evident to help erase some of the negative aspects from when they abandoned the marketplace," she said.

Today, Commodore appears to be sincerely interested in recapturing the education market. But, as Davidson alluded, that has not always been the case. As educators know, a few years ago the company decided to move away from education, losing its early share of the market to Apple and IBM in the process.

According to Leonard, many educators at that time were confused and unsure of Commodore's future. "They didn't know whether Commodore was going to even make computers," she said, "and educators don't want to buy into a company if it's not going to be there."

Harold Copperman, president and chief operating officer of Commodore's U.S. operations.

Even before Commodore walked away from the schools, many in the marketplace felt that Apple did a better job servicing and supporting the educators.

Bill Dinsmore, president and chief executive officer of The Learning Company, said, "A lack of service orientation precluded them [Commodore] from having a base like the Apple II."

DiLullo attributes Commodore's past instability in the education market to a bad reputation, in addition to untimely educational marketing decisions.

"When I came here, there was a lot of criticism and bad-mouthing Commodore, especially in education," DiLullo said.

He added that the negative talk was one of the main reasons for forming the Commodore Educational Advisory Board. "It represented an opportunity to bring these people together, sit down with them and see what they have to say instead of listening to people bad-mouthing us," he said. "They would also sit down and listen to what we had to say."

Past leadership didn't help matters much when the company abandoned the education market and concentrated its U.S. efforts in other market segments.

"The previous administration publicly stated that the 64 would become a consumer machine," DiLullo said. "How can you expect educators to remain loyal?

"They could've done things a lot better," he said. "Right at that time, Apple and Commodore were neck and neck. When [Commodore] went to consumer channels, it allowed Apple to move in, but that's hindsight."

Davidson, a software publisher who developed titles for the 64, believes Commodore did miss a real opportunity. "They could've maintained or increased market penetration," she said. "With their pricing points, they could have had a nice solid niche in the market."

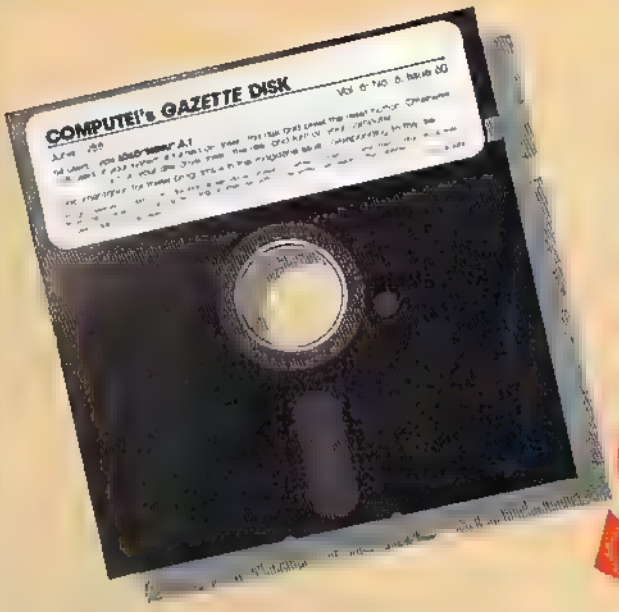
Oh! Canada!

Although Commodore dropped the ball in the U.S. education market, that has not been the case around the world.

"Canada is unreal," DiLullo said. "Commodore dominates that whole area." He added that the situation is similar in West Germany, Italy, France, and Belgium.

"There were no public statements in those countries about leaving education," DiLullo said.

DiLullo added that Commodore wants to make it up to users in the U.S. and has initiated a comprehensive program to bring educators back into the fold.



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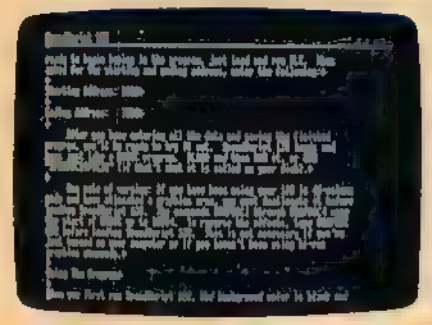

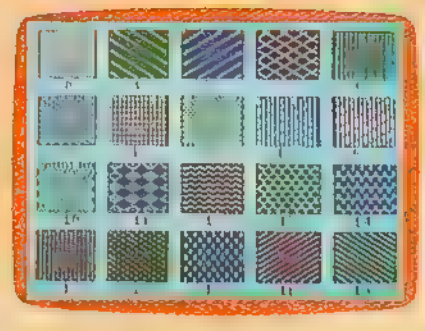

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ABOUT FACE

Modern Classic

Commodore plans to position the 64 as a "Modern Classic." A poster illustrating this theme has been released to educators. The poster features a time line tracing the history of the 64 along with what was happening in the world at that time, a chart that lists a sampling of educational software available, a list of resources available for information and advice, a list of hardware enhancements, a computer glossary, and a matching game.

A program to refurbish 64s already in classrooms has been initiated by Commodore. There are also rumors that the company will offer schools the chance to trade in their 64s for Amigas or MS-DOS machines, but Commodore would not confirm this report.

Commodore also wants schools using 64s to let it know where they are located, and it will in turn keep them up-to-date on new and updated programs. An educational software catalog has also been produced.

Bringing the support closer to home, Commodore's education dealer program has been strengthened, with each dealer in the network furnishing personnel to deal

Commodore's Modern Classic education poster features a list of ways to enhance your 64, a computer glossary, a chart of popular education software developed for the 64, and a list of resources including *COMPUTE!'s Gazette*.

with the market, informing educators of opportunities and support.

DiLullo said that although the dealers' primary focus will be on the Amiga, there will always be companywide support for the MS-DOS line and the large installed base of 64s.

School Use

Leonard said that she plans to continue using the machines for the remainder of this year and throughout next year.

"We started in 1983 and we have no plans to scrap the 64," she said. "We have a big investment in Commodore 64 software and, as long as there is life in the machine, we'll be using it."

She added that she would find it necessary to make a change when it became too costly for her to maintain the machines.

When asked which direction she would take when it becomes necessary to change, Leonard replied, "It depends on what our needs are and who has the system that will adequately address those needs. I have to go where the hardware has curriculum software developed for it."

Few New Programs

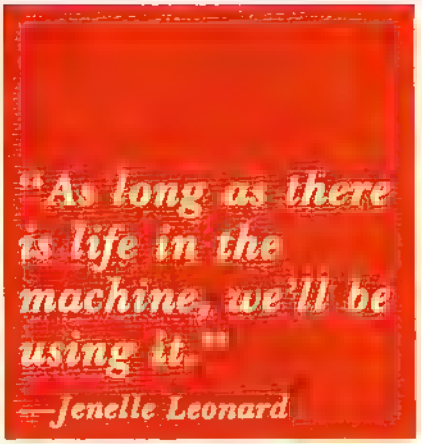
Education software publishers have either slowed down or completely stopped development for the 64.

Leonard offered an explanation: "I think it's because they [the software publishers] got signals that Commodore was out of the education marketplace and sales started decreasing," she said.

"I'm finding it harder and harder [to find 64 software] and I'm getting mixed signals," she said. "Some vendors say they're going to discontinue their Commodore software products while others say they're still developing programs."

Leonard said that she can find a few isolated programs to meet some of the schools' needs, but not all. "It's been just kind of hit and miss," she said. "It's become a make-do situation."

DiLullo feels that the situation has stabilized. "Last year we



suffered a big loss with three or four companies deciding not to support the 64," he said. "We stopped the slide, which was our basic goal."

He added, "Since there is a large installed base, it would be foolish for the software publishers to walk away."

Diamond pointed out that part of the problem lies with the software developers; he plans to approach them about renewing their interest in supporting the 64.

The Publishers' Viewpoint

The Learning Company, which produced popular 64 education titles such as *Reader Rabbit* and *Rocky's Boots*, has stopped developing programs for the 8-bit machine.

"We believe in developing a few quality products, and as a result we focus our resources on machines that are growing into the future," Dinsmore said. "We have to keep the focus tight so that we do not dilute the quality. The industry spreads itself too thin. There are too many titles on too many formats, and the quality suffers."

He added that titles such as *Reader Rabbit* still sell well in the 64 format. So why not produce 64 versions of newer titles?

"It would be tempting to convert [other titles to the 64]," he said. "But because it's such a big resource investment, it doesn't make sense for us."

Like The Learning Company, Davidson and Associates still sells older titles for the 64, but it has stopped the development of new products for the 8-bit machine.

"In the last couple of years, we developed the Davidson Desktop Interface, and it requires extra memory that the 64 doesn't have," Davidson said about the pull-down menu program her company has added to its products. "Without the interface, it would be such a different product."

She does see a better relationship developing between Commodore and software publishers. "When Commodore pulled out of the education market, a lot of publishers didn't continue to support them," Davidson said. "Now that they're back, a lot of companies are considering supporting Commodore, especially the Amiga."

Davidson has no plans to develop any further products for the 64 or 128 but is currently working on developing educational products for the Amiga, including an Amiga version of *Math Blaster! Plus*.

Technology Moves On

Commodore once again has big plans for the education market. For 64 users, it offers full support for the existing base. But from now on, the company sales force will approach educators armed with brochures touting the Amiga as the education computer of the 1990s.

"Many people think we should still advance the technology of the 64," DiLullo said, adding that many of these people become angry at Commodore for not concentrating more on the machine. "You should not expect more than it can deliver. There's only so much you can squeeze out of a 64."

But many Commodore users do not want to hear the inevitable: that their machines have limitations and will become obsolete.

Leonard put it best when describing 64 users. "These people are loyal," she said. "It was probably their first computer, and to these people the first is always the best." G

EDITOR'S CHOICE

BLOCK BATTLE

Jon Dearden

NAVIGATE YOUR WAY THROUGH AN EVER-CHANGING, MULTILEVEL PLAY FIELD IN THIS CHALLENGING ONE- OR TWO-PLAYER STRATEGY GAME FOR THE 64. JOYSTICK(S) OPTIONAL.

You're safely perched on solid ground, but this is no time to relax. Across a field of shifting footholds, you spot the enemy, poised for attack. Your mission is to cross the field, whatever the costs. It won't be easy—one misstep could drop you into oblivion.

"Block Battle!" is a strategy game for the 64 in which you and your opponent—either a friend or the computer—go head-to-head in an attempt to move an army of blocks across a treacherous battlefield. What makes this game so tough is that it's actually played on three levels at once. But if you have a good memory and you're a little lucky, you can outmaneuver your opponent.

Getting Started

Block Battle! is written in BASIC. Enter the program using "The Automatic Proofreader," found elsewhere in this issue. When you've finished typing, be sure to save a copy of the program to tape or disk.

The game is played with joysticks or from the keyboard. If you have two joysticks, plug them in. (If you have only one joystick, plug it into port 1.) Then load the program and type RUN. After the play field is drawn, the program prompts you for a one- or two-player game. To play against the computer, press 1; to play against a friend, press 2

A Window of Opportunity

In Block Battle!, each player begins a game with six blocks, positioned in the gray starting zone on either side of the play field. The green player is on the left; the yellow player is on the right. (In a one-player game, the computer always assumes the role of the yellow player.)

The object of the game is to slide your blocks across the play field to the safety of your opponent's starting zone—that is, your end zone. The green player moves the green blocks to the right, while the yellow player moves the yellow blocks to the left. The player who can position the most blocks in his or her end zone wins the game.

So far, this may sound easy; but it's not. Separating you from your end zone is a 6 × 6 grid of windows showing one of three colors: blue, red, or black (see the accompanying figure). These colors represent the three layers beneath the play field. The top layer is blue, the next layer down is red, and below this is a bottomless, black pit.

The top two layers of the play field contain randomly placed holes. When holes in the blue and red layers are vertically aligned, the black pit below is exposed. What results is a "black hole" in the grid. Blocks that fall through a black hole are never seen again.

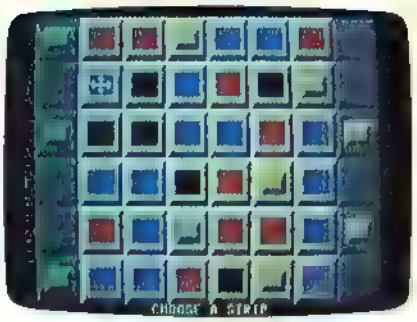
The red layer, because it's the second level down, is only visible when the blue layer above contains a hole at that location. As the top layer, the blue layer may or may not conceal a hole in the red layer below. To make things even more interesting, the locations of the holes may change during each turn. As you'll see, crossing the grid is somewhat like tiptoing across a pond covered with thin ice on a foggy night.

Shifting Strips

When it's your turn to move, a message in your color will appear at the bottom of the screen, instructing you to choose a block. Use your joystick (port 1 for the green player, port 2 for the yellow player) to direct the white cursor to one of your blocks, and then press the fire button to select it. If you're using the keyboard, move the cursor to the selected block with the cursor keys; then press RETURN.

After you've made a choice, the game prompts you for a direction of movement. Simply move your joystick in the direction you would like the block to go (either horizontally or vertically). If you're using the keyboard, press the cursor key that points in the desired direction. Your block will then slide over one position in the direction you've indicated. Note that you're not allowed to move into a black hole (who would want to, anyway?) or onto another block. The only exception to this rule is when you're in your end zone. There, if your opponent has unwittingly left a block behind, you can eliminate it from the board by moving one of your blocks onto it.

Next, the program asks you to choose a strip to move. The blue layer on top actually consists of six separate horizontal strips that may move left or right one position. Each strip contains three holes. The red layer is composed of six strips running vertically; these strips may move one position toward the top or bottom of the screen. Each red strip contains two holes (again, see the figure).



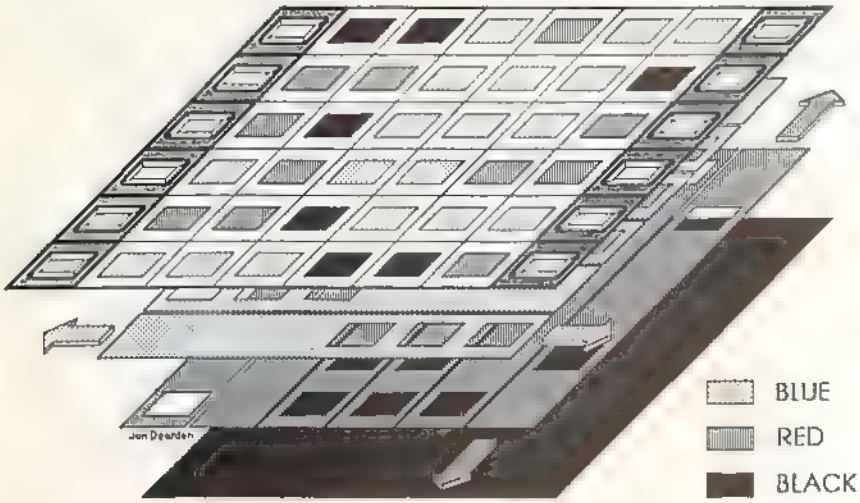
The green player is set to drop the yellow player's block into oblivion

To move a colored strip, direct the cursor to the row or column of your choice and press the fire button (or press the RETURN key if you're using the keyboard). When asked to indicate the direction of movement, move up or down to shift a red strip, right or left to shift a blue strip.

Things can really become nasty here as you attempt to sink your opponent's blocks into the darkness below. Try to eliminate your opponent's blocks by opening a hole beneath them. Or reposition the holes to allow safe passage of your own blocks.

When one player moves more blocks into his or her end zone than the opposing player has left on the board, that player is declared the winner. To play again, press the fire button on either joystick or press RETURN.

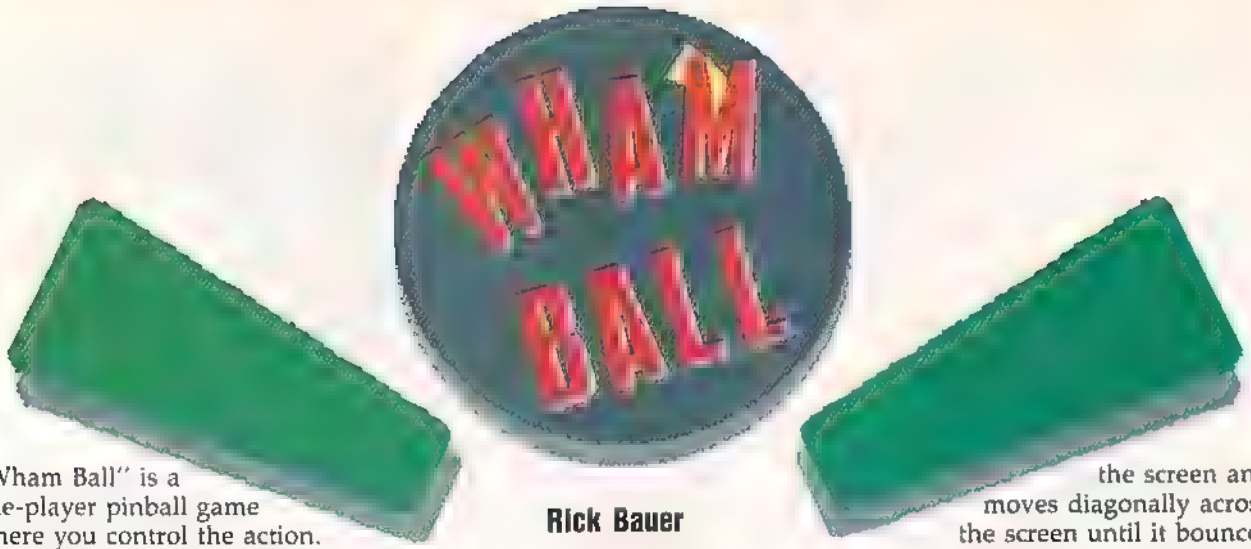
If you wish to quit in the middle of a game, you'll have to turn off the computer and reload the game; pressing RUN/STOP–RESTORE causes the computer to lock up.



Typical Strategies

Block Battle! is a challenging game requiring thoughtful tactics. Be careful not to expose too many of your blocks to danger at once. You may choose to move a block into your end zone as quickly as possible and then eliminate any remaining enemy blocks once you get there. Or, you may decide to obstruct the movement of your opponent's blocks while positioning black holes beneath them. Whatever strategy you settle on, Block Battle! offers a multitude of exciting variations.

See program listing on page 84. **G**



Wham Ball

Rick Bauer

"Wham Ball" is a one-player pinball game where you control the action. It features 26 screens, 32 speeds, and up to 40 randomly placed Whammies per screen. And, since the game uses keyboard control, you won't need a joystick to play.

Play it off the walls and knock down the Whammies. Even slap the machine around a little, but don't tilt it! Undoubtedly, this is one of the best pinball simulations we've seen for the 64.

Getting Started

Wham Ball is written in machine language, but it loads and runs like a BASIC program. Use "MLX," the machine language entry program found elsewhere in this issue, to type it in. When MLX prompts you, respond with the values given below.

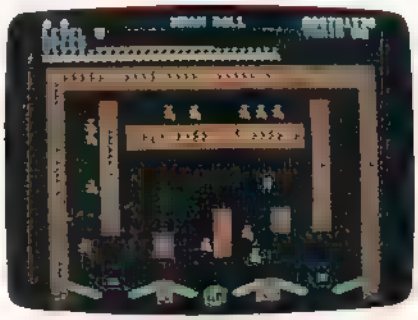
Starting address: 0801
Ending address: 1650

When you've finished typing the data for Wham Ball, be sure to save a copy to tape or disk. To play the game, simply load the program and type RUN.

Wham Ball displays the main screen and waits for you to press a key. At this point, or anytime after completing a level, the function keys become active. Press f1 to put you into trainer mode, where you can enjoy an unlimited number of balls. To return to regular playing mode, press f2. Press f3 to increase the speed of the ball and f4 to decrease it. You can also increase or decrease the level you start on by pressing f7 or f8, respectively. When you're ready to play, press RETURN.

Playing the Game

The object of Wham Ball is to knock out all the Whammies on each level, thereby advancing you to the next screen. As the game begins, you see six flippers near the bottom of the screen. You control the left flippers with the Commodore key and the right flippers with the cursor-right key. You also see walls placed in and around the screen



With three sets of flippers, the action in "Wham Ball" is fast and furious.

The screen is always surrounded by walls, but the placement of the walls in the middle of the screen depends on the level.

In addition to the flippers and walls, the screen also contains drop targets and randomly placed Whammies. Hitting the center drop target raises the center bumper at the bottom of the screen, and hitting the drop targets in the lower left and right corners lowers the bumper. Because the bumper keeps the ball from falling through the hole at the bottom of the board, it's a good strategy to raise it as soon as possible.

When you release a new ball, it starts from the lower right corner of the screen and moves diagonally across the screen until it bounces off an obstacle. The ball rebounds off walls, the center bumper, and the flippers. It passes through Whammies and drop targets, thus removing them from the screen. Hitting a wall scores 10 points, while hitting a Whammie scores 200 points and advances the bonus.

If a ball rolls down between the flippers, you lose it. You start with five balls and are awarded an extra ball after completing each level, but you can accumulate no more than five balls at once. After completing a level, you receive a bonus for each Whammie you've hit.

A Little English

You can hit all the Whammies on the board, but some require bank shots. The position of the flipper when a ball strikes it determines the angle at which the ball rebounds. If you can't quite seem to get the right angle, you can "bump the machine" with the RUN/STOP key.

The bump feature is useful if the ball becomes caught in an endless bouncing pattern. Similarly, bumping the machine can prevent a ball from rolling down between the flippers. Bumping can get you out of impossible situations, but it should be used judiciously. A quick, light tap will shake the machine, but a hit that's too hard causes the machine to tilt. When you tilt, the center flippers disappear and the other ones freeze for approximately 14 seconds. If you're lucky enough not to lose your ball, play continues as normal.

If you get a phone call in the middle of a great game, you can press the SHIFT-LOCK key to pause the game. Releasing the key resumes the action.

See program listing on page 80. **G**

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MEMO CARD

William Chin

Here's a computerized box of index cards with powerful search and sort functions for the Commodore 64. Disk drive required. Printer recommended.

Database programs are very powerful but often complicated and complex. Most people don't organize their lives into the neat little fields a database program requires. "Memo Card" gives you the power of a database without the fuss. All your data is kept on cards that you can easily sort, search, and print. There's even a browse mode for quickly scanning through information.

Anything you organize with index cards, Memo Card does better. Use it as a Rolodex of names, addresses, and phone numbers. Store your favorite recipes. File away important facts for school or work. Memo Card combines the usefulness of index cards with the speed and flexibility of a computer.

Getting Started

Memo Card comes in two parts: a machine language program and a BASIC program. Use "MLX," found elsewhere in this issue, to enter Program 1, the machine language portion of Memo Card.

Use "Memo Card" to keep a calendar of daily chores or important events. With the Alternate function, you can have two cards onscreen at once.

When MLX prompts you, respond with the values given below.

Starting address: C000
Ending address: C7C7

Be sure to use the filename MEMO-CARD.ML when you save Program 1 to disk.

To avoid typing errors, use "The Automatic Proofreader," also found in this issue, to type in Program 2.

To use Memo Card, load and run Program 2. A blank card and a command summary appear on the screen. Each card consists of seven lines of 36 characters. To enter text, just start typing. Use the cursor keys, CLR/HOME key, and INST/DEL key to edit what you enter. When you've finished entering text into card 0, press f1 to proceed to the next card. Press f2 to get back to the previous card. To insert a card into the deck, press f5; to delete a card, press f6.

After you've entered information into some cards, press f8 to save the cards to disk. Enter a filename and press RETURN. If there's a file with the same name already on the disk, Memo Card asks for permission to overwrite it. Press Y to scratch the file and save over it; press N to exit back to the program with no harm done. You can always get a list of the disk directory by entering $ at the filename prompt.

To load a file, press f7. Again, you are prompted for a filename. Enter a filename or enter $ to list

the directory. After a successful load, Memo Card displays the number of cards found in the file. You are limited to 301 cards per file.

Press f3 to print the current card. Press f4 to print the current card plus all the cards following it in the file. If your printer is not online, an error message flashes on the screen. If this happens, put the printer online; Memo Card will try to print again after a brief pause. Cancel the printout by pressing the back-arrow key.

Control Commands

Many of Memo Card's features are accessed through *control commands*. To access a control command, simply hold down the CTRL key and press the appropriate letter. Press CTRL-H to see all the control commands available. Press it again to see the function-key commands. The commands don't have to be onscreen for you to use them.

Press CTRL-B (Beginning) to go to card 0. To see the last card in the file, press CTRL-E (End). CTRL-G (Get) saves the text from the current card into a buffer and CTRL-P (Put) copies the buffer information into the current card. To erase the contents of all the cards, press CTRL-N (New). You can sort the cards alphabetically with CTRL-T. Exit the program with CTRL-Q (Quit).

To search for a specific card, press CTRL-S (Search) and enter the phrase you wish to search for. Memo Card searches forward from the current card. The search is case-sensitive (upper- and lowercase letters don't match). To search the entire file, press CTRL-B before pressing CTRL-S. The first card that contains the search phrase becomes the current card. If no match is found, a NOT FOUND message appears. Press CTRL-R (Repeat) to repeat the search and find the next occurrence of the phrase.

Memo Card allows you to view and edit two cards on the screen at a time. Press CTRL-A (Alternate) and an alternate card appears above the command summary. Press CTRL-A again to get back to the main card. All the editing keys, function keys, and control commands work with the alternate card. For example, you can grab text from the main card with CTRL-G (Grab), press CTRL-A to activate the alternate card, use f1 and f2 to move to any card you want, press CTRL-P (Paste) to paste the previously copied text into the alternate card, and then edit that text as you please.

You may browse through your cards by pressing CTRL-C (Choose). In choose mode, the current card and the next 19 cards in the file are represented on the screen by their number and their first line of text. Use the cursor keys to select a card and then press RETURN to edit that card. The choose-mode display is updated to show more cards when you try to move the cursor past the top or bottom of the screen. The end of the file is indicated by a marker at the bottom of the list. You are at the beginning of the file when you see card 0.

One final note: Whenever a message appears at the top of the screen, it disappears after giving you time to read it (about four seconds). If you don't want to wait that long, simply press the space bar and the message will disappear.

See program listings on page 82. **G**

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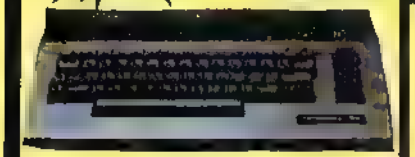

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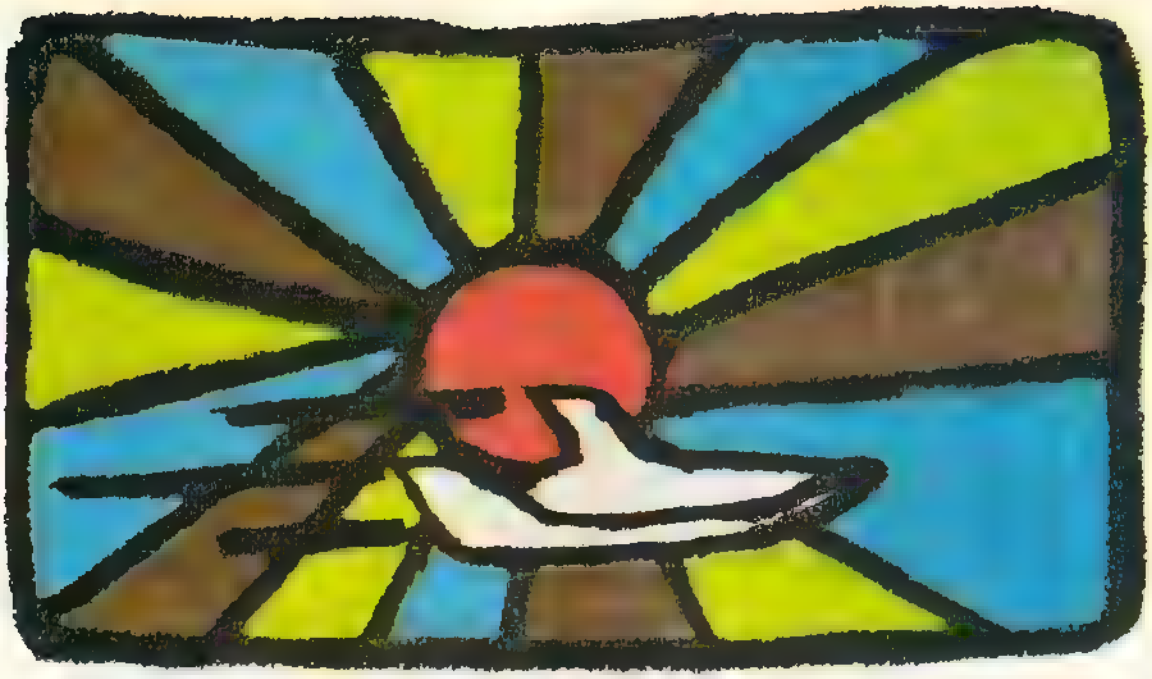


64 ANIMATOR

Hubert Cross

PRODUCE SMOOTH 3-D ANIMATION WITH THIS HI-RES GRAPHICS UTILITY FOR THE COMMODORE 64 WITH A DISK DRIVE. AN IMPRESSIVE DEMO IS INCLUDED.

Whether you're a beginner or an advanced programmer, creating animated hi-res shapes is no easy task. You can literally spend hours trying to achieve high-quality animation.

Now, however, there's "64 Animator," a tool that greatly simplifies this process. With this utility, you can paint or animate solid polygons and three-dimensional figures in as many as 16 colors. You can also easily "stamp" a figure into the background and then animate other figures over it. 64 Animator's routines are so incredibly fast that simple animations run quite smoothly.

Typing It In

64 Animator consists of three programs. The first two are written in BASIC, while the third is written in machine language (ML). Program 1, "Boot," is a short BASIC loader that configures the computer for the ML animation routine and then loads and runs Program 2. To ensure accurate typing, enter Program 1 using "The Automatic Proofreader," found elsewhere in this issue. Be sure to save a copy of the program to disk. Since it tries to load files from disk (files which you have not yet created), don't run the program yet.

Program 2 is a demo that illustrates some of 64 Animator's capabilities. Again, use The Automatic Proofreader to type it in. When you've finished entering the program, save a copy to disk. It's important to use the name DEMO because Program 1 expects to find a file by this name.

Program 3 contains the actual animator routines, which are just over 5K of ML. To enter it, use "MLX," the machine language entry program located elsewhere in this issue. When MLX prompts you, respond with the values given below.

Starting address: 4000
Ending address: 53CF

When you've entered the data, save a copy of the program to disk. Be sure to use the filename ANIMATOR.ML.

Drawing Figures

When you're ready to see some of what 64 Animator can do, load and run Program 1, the boot program. (This program performs several critical tasks that you'll need to have in your own programs. See "Additional Notes," below, for details.) When the demo finishes, list portions of the program to the screen; you'll see a series of new commands. One of these is **FIGURE**. The syntax for this command is **FIGURE** *number*, where *number* is in the range 1–63.

The FIGURE command tells 64 Animator which figure you're currently defining. A figure is an object that is composed of a series of polygons, which in turn are defined by a series of points. Following the FIGURE command in the demo are a group of commands that define these points and polygons. All such commands apply to that figure until the next FIGURE command is encountered.

To define a series of points, use the **POINT** command. Its syntax is

POINT *x1,y1,z1,x2,y2,z2,...*

where *x1*, *y1*, and *z1* represent the coordinates of point 1; *x2*, *y2*, and z2 define point 2; and so on. The coordinates of each point must be in the

range −64 to +63, inclusive.

Once a figure's vertices have been defined, they are connected using the **POLYG** command. Its syntax is

POLYG *number,color,bit pair,type, point 1,point 2,...*

Number is the number of points in the figure you're defining. The second parameter, *color*, sets the polygon's color, using the standard Commodore 64 color values (0–15). The *bit pair* parameter helps determine the color of the polygon. If it's 0, the polygon is drawn in the background color. If it's 3, the polygon is drawn with the text color. If it's 1 or 2, it's drawn in the color you specify. The *type* parameter can be ignored for now; it is explained in "Hidden Surfaces," below. The next parameters are the numbers of the points that form the polygon (the total number of points listed must match the first parameter).

When you design a figure, you must do it in a strict order: First, use a figure command, then define each point, and, finally, connect the points into polygons. If you don't follow this order, you'll get an error message such as ?ERROR #3 (a point command was issued after a polygon command). A figure is not considered defined until it has at least one polygon. Displaying a figure without polygons generates an error #5 (an undefined figure). If you enter a new figure while a previous figure is undefined, the previous figure is deleted from the figure database in memory.

To redefine an existing figure within a program, you must use the **CLEAR** command. Otherwise, 64 Animator issues an ?ERROR #8 (figure exists) message. Also, since the figure database is not cleared by RUN, you need to place this command near the beginning of your programs.

Displaying Figures

Once a figure has been defined, it is drawn on the screen with the DISPLAY command. Its syntax is

DISPLAY *number,angle X,angle Y,angle Z,X,Y,Z*

The first parameter, *number*, is the number of the figure to be displayed. The next three parameters control the figure's rotation about the *x*-, *y*- or *z*-axis, respectively. A circle is divided into 256 "computer degrees." A full circle is 256 computer degrees, a half circle is 128 computer degrees, and so on.

The last three parameters are the figure's *x*, *y*, and *z* coordinates, respectively. The origin is at the center of the screen, and only positive values are allowed for the *z* coordinate. Depending on the figure's coordinates, it may be completely on the screen, partially off the screen, or completely off the screen. While testing a figure, use these values to make sure that it appears on the screen:

DISPLAY *number*,0,0,0,0,0,200

Animation Commands

Computer animation is achieved by drawing a series of figures on the screen. The first figure is drawn and then erased. Then the next figure is drawn in a new location and erased, and so on. Smooth animation is achieved using two screens. A figure is drawn on a hidden screen and then that screen is displayed. While the new screen is being displayed, the old screen is erased, and the next figure is drawn on it. The hidden screen is then displayed, and the entire process repeats.

64 Animator simplifies this process with the **FLIP** command. FLIP displays one screen while it directs your drawing commands to the hidden screen. The old screen is erased by copying the smallest possible rectangle of the background screen over what you've painted on that screen. The smaller the area you paint over, the faster the command works. When you FLIP from the text screen, FLIP erases the first hi-res screen before displaying it.

In addition to the two hi-res screens mentioned so far, 64 Animator has a third hi-res screen that is not available directly. This third screen allows you to save your paintings and figures to the background with the **STAMP** command. STAMP saves the screen currently being displayed. Once you have drawn a figure and saved it with STAMP, it will not be erased even if you animate other figures or polygons over it. The command is ignored from the text screen. To make sure you save the screen that has your paintings or figures, always use the STAMP command after a FLIP command.

64 Animator supports three other useful commands: **ERASE**, **LOWRES**, and **SETCOLOR**. The ERASE command clears each hi-res screen, and the LOWRES command returns you to text mode. The SETCOLOR command changes the border, background, and text color. Its syntax is

SETCOLOR *border color,background color,text color*

where each color value must be in the range 0–15.

Although it may sound complex, creating a figure and then animating it is actually much easier than it seems. The short program below creates and animates a two-dimensional square once 64 Animator has been installed.

```
1000 SETCOLOR 14,6,0
1010 CLEAR:FIGURE1:REM
     SQUARE
1020 POINT −60,−60,0:REM
     VERTEX 1
1030 POINT −60, 60,0:REM
     VERTEX 2
1040 POINT 60, 60,0:REM VERTEX 3
1050 POINT 60,−60,0:REM
     VERTEX 4
2000 POLYG 4,1,1,3,1,2,3,4
3000 FOR N=1024 TO 0 STEP −4
3010 DISPLAY1,N,N/2,N,0,0,400+N
3020 FLIP:NEXT
3030 FOR DELAY=0 TO 1000:NEXT
     :LOWRES
```

The Paint Command

The **PAINT** command is used to paint a polygon on the screen with a specified color. Its syntax is

PAINT *number,color,bit pair,type,x1,y1,x2,y2,...*

The first parameter, *number*, indicates how many vertices the polygon has. For example, a line has two vertices, a triangle has three, a square has four, and so on. The second parameter, *color*, sets the polygon's color (0–15). The third parameter, *bit pair*, helps determine the paint color. If you use 0, the polygon is painted in the background color and the color number is ignored. If you use 3, the polygon is painted in the text color. When 1 or 2 is used, the polygon is painted the color you specify. However, it will change the color of every character cell it touches. That is, everything in that cell painted with the same bit pair changes to that color.

(It's your responsibility to avoid a conflict. If you use only four colors, this never happens. If you use more than four colors, don't mix more than four colors in any one character cell.)

Type tells the computer what kind of polygon to paint. A value of 1 creates a hollow polygon (only the borders are painted), 2 gives you a solid polygon, and 3 creates a solid polygon with borders painted with the text color. Nothing is painted when the type is 0.

The *x* (horizontal) and *y* (vertical) coordinate pairs of each vertex follows the type. To draw a triangle, for instance, you need three pairs of *(x,y)* coordinates. For example, the following command draws a white, solid, bordered triangle:

```
PAINT 3,1,1,3,10,10,90,10,50,90
```

The PAINT command automatically displays the hi-res screen. No special command is needed to change from text to graphics mode. Note that for this command, the origin is located at the top left corner of the screen and the *y*-axis is inverted; the higher a point's *y* coordinate, the lower it is onscreen.

There are two limitations to painting a polygon. First, you can paint a polygon with anything from two to eight vertices, but the polygon must be convex—its inside angles must be less than or equal to 90 degrees. Second, although you may start defining a polygon at any vertex, you must proceed in either a clockwise or a counterclockwise direction. If you do not follow these two rules, 64 Animator may paint strange shapes.

Hidden Surfaces

64 Animator is capable of drawing both two- and three-dimensional figures. Creating a three-dimensional figure is difficult. It requires knowledge of trigonometry and geometry and of hidden-surface removal. If you don't want to learn about these things, you can stick to two-dimensional figures. If you'd like to learn more, you can accomplish a lot by experimenting with the figures from the demo program.

64 Animator provides two powerful tools for hidden-surface elimination. This is accomplished with the *type* parameter of the POLYG command. Each bit in this parameter controls a certain function. Let's take a closer look to see how it works.

Bit 0 1 = Draw border of polygon.
0 = Don't draw border of polygon.
Bit 1 1 = Paint solid part of polygon.
0 = Don't paint solid part of polygon.
Bit 2 1 = Secondary polygon.
0 = Main polygon.
Bit 3 1 = Paint polygon only if it's not hidden.
0 = Always paint polygon.

A whirling card from the demo program.

For example, suppose the type number is 11. Expressed in binary, this is 1011 (bits 0, 1, and 3 on; bit 2 off). This means that when the polygon is drawn, its borders are drawn, it is filled with the color you specify, and it is shown only when it's not hidden.

Setting bit 2 makes the polygon a secondary polygon. When a main polygon (a polygon with bit 2 equal to 0) is hidden, neither it nor any secondary polygons that immediately follow it are drawn. If you are designing a cube with a letter on one of the faces, make the polygons that form the letter secondary. When that face is hidden, the letter is also considered hidden and therefore is not drawn. This speeds up animation considerably.

Additional Notes

64 Animator resides at location 16384 ($4000). Above it in memory are several lookup tables, figures, and hi-res screens required by the program. Program 1, the boot program, illustrates the general setup procedure required to use 64 Animator. You'll want to familiarize yourself with this program before you attempt to write your own programs.

Line 120 of Program 1 loads the ML portion of 64 Animator into memory. Next, line 130 lowers the top-of-BASIC pointer to protect the ML program and its data, leaving 14K of memory free for BASIC programming. In lines 140–200, a sine/cosine lookup table used for rotating figures is then POKEd into memory at 37019. Lastly, the command SYS 16384 in line 200 installs 64 Animator.

Once 64 Animator is installed, there are two hi-res screens available at all times. Use the function keys to flip between screens. The f3 key displays hi-res screen 1, the f5 key displays hi-res screen 2, and the f1 key returns you to text mode. It's best not to use these keys during save and load operations.

You can have as many as 63 figures at one time with 64 Animator, and a figure may have up to 63 points. There is no limit on the number of polygons per figure, other than the limited amount of memory available. You can enter more than three coordinates with each POINT command, but the total number of coordinates you enter must be an exact multiple of 3.

64 Animator Error Messages

Error Number	Meaning
1	Illegal number of vertices
2	Illegal bit-pair number
3	Point after polygon
4	Too many points
5	Undefined figure
6	Undefined point
7	Illegal figure number
8	Figure exists
9	Illegal point number

64 Animator does not check whether the vertices of a polygon lie in the same plane. If a polygon with four or more vertices seems to change shape, suddenly disappears, becomes a dot, or loses its borders and shows random colors at the top when rotated, you should examine its points to see whether they lie in the same plane.

Avoid pressing the RUN/STOP–RESTORE key combination, since this may lock up your computer. If you do press RUN/STOP–RESTORE and the computer does not lock up, a SYS 16384 will reenable the function keys, but it also clears all figures in memory.

See program listings on page 86. **G**

REVIEWS

Last Ninja 2

The catlike figure in black stalks the shadows, his cold, piercing eyes barely visible. With a shimmer of reflected light from his spinning sword, the figure leaps from the darkness and strikes a ready pose. The Last Ninja has returned, and he's back with a vengeance.

Last Ninja 2 is the continuation of the adventure begun in *Last Ninja*, an earlier program also from Activision. This time our lone warrior hero has been transported from the Orient to New York City, determined to defeat an evil warlord and restore pride to the time-honored title of ninja.

Unlike so many slash-and-bash-style games that fill software shelves these days, this exceptional adventure demands a combination of skills. One needs the finely tuned joystick reflexes developed in fast-paced arcade games combined with the puzzle-solving detective skills honed in complex adventure games. To answer the obvious question of whether this game is as good as its predecessor, *Last Ninja* fans will be pleased to know that *Last Ninja 2* is nothing short of terrific!

The Last Ninja has returned, and he's back with a vengeance.

The Big Apple adventure starts in the very center of the city: Central Park. Trapped in a large bandstand, you are attacked by an angry attendant who must be subdued before you can concentrate on finding a way out. Once outside, be prepared to battle all you encounter, for the evil warlord has turned the entire city against you. Clues to advance your quest and weaponry are scattered throughout each multiscreen level of the game. Careful searching and piecing together of bits of information will prove important later.

Your not-so-leisurely stroll through the park requires you to avoid or dispatch all aggressive opponents while solving the puzzle of how to escape level 1 and move to the next level, The Streets. After locating and learning to use the nunchakus, shurikens, and your sword and staff, opponents become easier to neutralize and less of a threat. As the game and the levels progress, however, foes are more likely to revive themselves and resume their attacks.

The Sewers offer a most challenging third level of play where rats, large spiders, and an alligator, along with the regular human adversaries, confront our hero. Seven levels in all feature hazards and problems that make a ninja's life miserable but provide a thrilling adventure for a game player.

There are many excellent features in *Last Ninja 2*. The screen images are sharp, clear, and logically placed. The Power indicators for the ninja and his opponents are located for easy viewing during the melee. A quick press of the function keys changes the display to items you want to hold or weapons you wish to wield. Joystick control can be set in three different control patterns, so finding the one that suits you is as easy as pressing J on the keyboard.

Everything in *Last Ninja 2* is put together well—from the attractive packaging and excellent documentation to the superior 3-D graphics and a soundtrack worthy of its own album. Included in the instruction booklet are oddly worded and vague clues for each level of play. While some of the hints are corny and painfully simple to decode, others may zoom right past you. These snippets of information are not enough to make the game—pardon the pun—a walk in the park. It's tough. Very tough.

Nothing is more frustrating than to be stuck in a complicated game, like this one, and have nowhere to turn for help. Activision has solved this problem by providing a User's Product Support Bulletin Board System (BBS) that anyone with a modem may call to seek advice about any Activision game. The atmosphere is friendly and the sysops, as well as users, are very helpful.

If there is any weakness in *Ninja 2*, it's the story line. What little there is seems to be confusing and disjointed. But then again, who cares? Make up your own story and enjoy the fast action and the exhilaration of victory that comes to a wise and nimble ninja. *Last Ninja 2* is an easy game to play, a very difficult game to solve, and an even more difficult game to stop playing.

—Steve Hedrick

Last Ninja 2
Activision
3885 Bohannon Dr.
Menlo Park, CA 94025
$34.95

Keith Van Eron's Pro Soccer

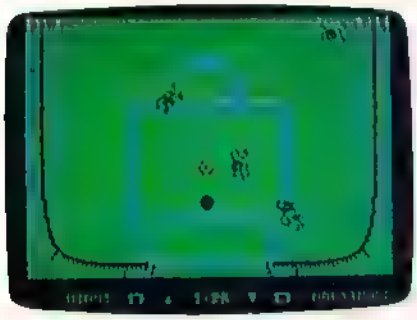
Soccer isn't big in North America. Professional leagues crop up now and again but inevitably fail, unable to compete against baseball in the summer or football in the autumn. Importing major stars from Europe and South America doesn't help for long. The game seems destined not to catch on.

In this respect, North America differs astoundingly from the rest of the world. In South America, Europe, Africa, and, increasingly, Asia, soccer (called *football* in most places) is the most popular sport, bar none. Children dream of becoming soccer players, and huge, chanting crowds fill enormous stadiums. The final game of the World Cup tournament, held every four years, is the most-watched sporting event on the planet.

Strangely enough, one kind of soccer seems to have successfully attracted American crowds: Indoor soccer made its debut in the 1970s and is alive and healthy as we turn to the 1990s. I say *strangely enough* because indoor soccer is hardly soccer at all. Relatively high-scoring, with action fundamental to its

nature, this sport is far closer to hockey than to outdoor soccer.

So which game do you give the sports-loving computer gamer? The outdoor game, with its long history and its low scoring, or the indoor game, with its emphasis on speed and scoring? For MicroPlay, the answer was simple: Why choose one game when you can offer both?



Keith Van Eron's Pro Soccer gives you the indoor game on the A side of the disk, the outdoor game on the B side.

Fair, though, is the best rating I can give. Of the two offerings, the indoor game is better represented because the focus of this program, like the focus of indoor soccer, is on action. In real life, the outdoor game is based upon build-up and play making, not on shots on goal and scoring. *Pro Soccer* does little to simulate that aspect effectively, despite the endorsement of Dallas Tornado goalkeeper Keith Van Eron. The problem with this package is that the indoor and the outdoor games play almost identically, whereas in real life they are very different games.

Pro Soccer's strengths are its variety of kicks and setups. You don't just kick the ball in this game, you kick it in one of four ways. The volley is the easiest kick to learn, and the one you will use most often when you begin to play. It is a straight, low kick, accurate but easy for the goalkeeper to stop. Chip shots travel high in the air but only move short distances. The scissors kick is an over-the-head kick that sends the ball in the direction opposite the way the kicker is facing. The fourth is the banana kick, which curves to the left or right. You must learn how to master volleys and banana kicks if you have any hope of winning a game of *Pro Soccer*.

Another technique you'll need to master is tackling. Unlike football tackles, tackles in soccer are the way in which a defending player takes the ball away from the attacker. Usually, it simply means sliding into the ball and knocking it away. In *Pro Soccer*, the best computer teams tackle very well; in fact, tackling is far too frequent. Against a good team, it's nearly impossible to make any progress.

Where *Pro Soccer* shines is in its tournaments. In the outdoor game, for instance, you can play against 16 World Cup teams in order of increasing difficulty (the Medalist challenge), or you can play face-to-face against a friend. The third option, and by far the most interesting, is participating in a World Cup tournament. You can choose to be one of 29 international teams, including the U.S.A. and Canada, trying to advance through the first round into the second, then through the quarter-finals, the semifinals, and on to the World Cup final. In real practice, though, you'll rarely make it to the semis unless you choose one of the top teams: Brazil, Italy, West Germany, or the U.S.S.R. Even then you'll be hard-pressed to defeat the computer.

Pro Soccer suffers from a problem notable in games of this sort. It is possible to find the exact pixel from which to shoot the ball, guaranteeing that you will score against all but the very best teams. This produces scores like 8-0 or 10-1, and soccer, at least in the outdoor version, seldom works this way. Once you play with the upper-level teams, though, this ploy doesn't work; with them, you must master the banana kick.

Which do you offer the soccer gamer—the indoor or outdoor version? MicroPlay's answer: one on each side of the disk.

The indoor game plays very well. Ricochets off the boards mean almost everything, as they do in the real game. Shots on goal are plentiful, and goals are frequent. In other words, it simulates well.

By contrast, the outdoor game disappoints. It's fun working through the World Cup tournament, but the game's limitations are frustrating. I can't help but think that *Pro Soccer*'s designers realized early that their indoor game was better, so they turned their attention in that direction. The outdoor game is promising, but it needs some redesigning to make it as strong as it should be.

One warning: *Do not* save a tournament in progress to your master disk. The program does not check for a valid save disk, and saving to your master makes the game impossible to load.

—Neil Randall

Keith Van Eron's Pro Soccer
MicroPlay
Distributed by Medalist International
180 Lakefront Dr.
Hunt Valley, MD 21030
$34.95

Word Writer 4

As Commodore 64 word processors go, *Word Writer 4* is more complete than most. It features an outliner, mail-merge, a spelling dictionary (you can also have a personal dictionary), and a thesaurus. It gives you fonts and style options such as underline, bold, italic, superscript, and subscript. It provides a calculator that's available at a keypress and a macro capability.

The key basis for criticism of a word processor is whether it can keep up with you. If you have to stop and wait for it to catch up, all the convenience and formatting features in the world won't make up for it. That's my principal objection to WYSIWYG word processors in general: When I type at my normal rate of speed, some word processors are more concerned with keeping the text pretty than with accepting my typing. *Word Writer 4* is fairly fast. It could keep up with my typing, anyway. It lost some text when the text buffer was nearly filled with a single paragraph. (How often do you write ten-page paragraphs?) The key to *Word Writer*'s speed is the size of the paragraph. The word processor works well with ordinary-length paragraphs, but as your paragraphs grow in size, the formatting feature takes longer and longer chunks of time away from your typing. There are always tradeoffs.

The program can cope with a text file up to 33,608 bytes long, but it's probably not a good idea to run any application within a hair's breadth of its capacity. Keep a document down to about five pages and your paragraphs down to 10 or 15 sentences and you'll have no problem. (*Word Writer 4* supports chaining documents, so you can print a long document made up of shorter sections.) The difficulty in managing long documents is in the 64's sluglike 6510 microprocessor, not in the software. If you write trilogies for a living, do yourself a favor and buy a PC.

Word Writer 4 is relatively easy to learn and use, aided considerably by a keyboard template and a logically laid-out manual. I was able to copy most of the files to a 1581 disk drive, which made the program much more convenient to use, but the thesaurus is a series of relative files and I was at a loss as to how to back them up without doing a sector-by-sector disk copy onto another 5¼-inch disk. Its limitations with regard to disk drives should be explained more clearly in the documentation. To put it briefly, most of the advanced features, such as converting GEOS fonts and importing text files, can be accomplished only on the 5¼-inch drive. There appears to be no support for the mouse or REU.

I found it troublesome that there

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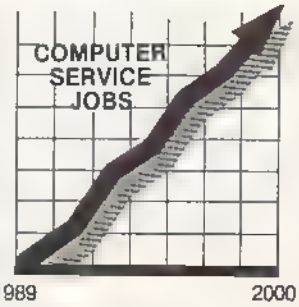

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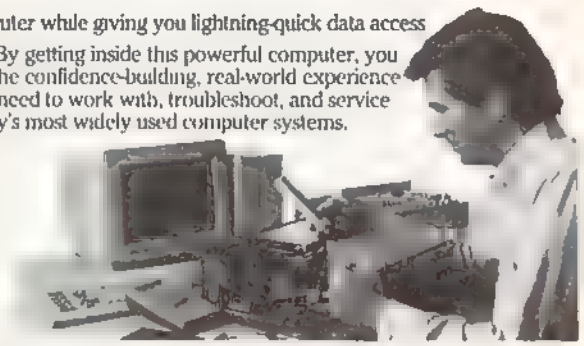

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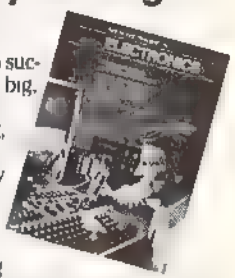

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was no way to go back to the INSTALL program from the word processor. This means that to do fairly simple tasks such as changing the list of selected fonts (each font size is counted as a separate font and you're allowed ten fonts in a document) or importing and exporting files, you have to quit the word processor, go to BASIC, and run the INSTALL program. If there were a single improvement I could make, it would be a simple bridge back to INSTALL. Some of the INSTALL features ought to be directly accessible from the word processor as well, such as the importing and exporting capability and the file-copy routines.

This new word processor is powerful, complete, and fairly easy to learn and use.

Word Writer 4 has a search-and-replace feature, but it will find only whole words and matching case. Say you're searching for the word *rat* and want to replace it with *mouse*. At the prompt, type in *mouse*. The change will not affect *rat*chet or ber*at*e as many search-and-replace features will, nor will it change *rat* to *mouse* unless you run the search-and-replace feature again.

The word processor supports a wide variety of printers, including IBMs, Okidatas, Stars, Geminis, and Epsons, as well as the Commodore line (but no laser printers as far as I could determine). It won't print fonts on printers not designed for graphic printouts.

The fonts provided have names of major Midwestern cities—Desplaines, Deerfield, and Madison, for instance. Generally speaking, the fonts are pleasant to look at, and they come in a nice variety of sizes. The blurb written on the packaging indicates that the *Word Writer* fonts are better than the GEOS fonts because they print with greater dot-density. And it's true. The GEOS fonts don't look as good on paper as the *Word Writer* fonts do.

Aside from printing quality, the *Word Writer* fonts are far more interesting than the set that comes with the basic GEOS package. The fonts include, among others, a Courier font (Racine), a Roman font (Wilmette), and fancy fonts (calligraphic Ravina and art-deco Madison). They've even included a dingbat font (Doodad—named after Doodad, Illinois, probably). Doodad features buildings, fruits, animals, arrows, a knife, a handgun and an automatic rifle (for members of the NRA), and dozens of other things, a few of which defy description. (These dingbats are what Timeworks refers to as *mini graphics*. Except for this font, there is no way to import graphics into a *Word Writer 4* document.) TimeWorks also offers a disk with a collection of attractive fonts. While they aren't as bizarre as the fonts on Berkeley Softworks' Font Pack disks, they're more tasteful and therefore more useful for most desktop publishing tasks.

However, if you really want them, you can use GEOS fonts with *Word Writer 4*. This involves transferring your GEOS fonts to the *Word Writer* disk and then converting them to the *Word Writer* format.

The spelling checker is an interesting feature. It very rapidly creates an alphabetized list of unique words in your document and then checks each word against its 85,000-word dictionary.

It can take several seconds for the computer to locate a word deep in a dictionary file (there are 26 individual files in the dictionary).

It recognized words like *reiteration* and *sulfur* and knew *sulphur* as an alternate spelling of that chemical element. You are given the options of correcting the spelling of each word as it appears in the document, skipping the word, or exiting the spelling checker. You can create a personal directory, which is simply a text file with the word *LIST* at the top and each entry on a single line. If a personal directory exists on disk, the spelling checker will use it. It asks for the name of the dictionary file first, so you could have several personal dictionaries on disk and pick the most appropriate one for the current document.

Online access to a thesaurus is one of the most beneficial aspects of electronic word processing. It actually improves writing in many cases, expanding a writer's vocabulary and suggesting additional associational pathways, whereas most of the other tools available are merely designed to make writing easier and quicker.

When you call up the thesaurus with a keypress, you'll be prompted to insert the thesaurus disk and enter the word for which you want a synonym. I typed *rampant* and pressed RETURN. The thesaurus came up with 19 synonyms on two pages. The pages represent *clusters*, each of which corresponds to a shade of meaning. You can select the page with the cursor keys and enter a word into text at the current cursor location by typing its number and pressing RETURN. The new word will replace the word on which the cursor is resting.

Word Writer 4 features a recording macro. Exssentially, you press Commodore-5 and then enter whatever keypresses you want to automate. You can enter a text string or a series of command keys, including selecting, copying, deleting, and so forth. When you've finished with the program, press Commodore-5 again. Then, whenever you want to run the program, press Ctrl-5. It's like magic. Suddenly a complicated series of entries is a single keypress away. Features like this make me greedy. I wish they had provided for a library of macros, but you can have only one. You can save your macro to disk so it will be loaded when you load the program.

If you're working with huge text files and speed is important, you should be working with another computer. If you have a 64 and you're interested in working with fonts, you should look into *Word Writer 4*. The Timeworks fonts are a real plus. And the addition of the thesaurus and the macro capability make this program a powerful contender.

—Robert Bixby

Word Writer 4
Timeworks
444 Lake Cook Rd.
Deerfield, IL 60015
$39.95

Tower Toppler

My husband, Dave, does not like arcade games; he finds them frustrating. For this reason, *Tower Toppler* didn't tempt him. If you're like he is, disinclined to grab a joystick or lay hands on a fire button, this game is not going to change you. But if your frustration threshold is higher than average, you'll find *Tower Toppler*, from Epyx's U.S. Gold line, a lot of fun.

Tower Toppler ***gets high marks for entertainment, great graphics, and just plain fun.***

I like science fiction, and perhaps deep down I've always wanted to be a hotshot demolitions expert sent to exotic planets to perform my job with enviable skill. On the other hand, I don't recall ever wanting to look like a cross between a frog and a dragon with Kewpie doll eyes and a whimsical pointy tail, but—what the heck—that's what *Tower Toppler*'s designers gave us.

The basic premise of *Tower Toppler* is that you (the peculiar, but absolutely adorable-looking dragon/frog) have been sent by your firm, Destructo, Inc., to the planet Nebulus to blow up eight mysterious rotating towers. These towers protrude from the planet's toxic ocean surface, and each is guarded by various weird creatures: flying eyeballs,

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metal-jacketed spherical robots, and multicolored cannonballs. Only the colored balls and flashing boxes can be felled by your weapons (you get to throw snowballs at them). Silver balls are not impervious, but they can be stunned. All other enemies must be assiduously avoided, making this a game of timing more than one of firepower

The tower watchdogs don't destroy you, per se. Instead, they bump you off the tower. If you're lucky, you'll land on another part of the stairway. If not, you're headed for the drink, and this noxious stuff eats you alive. On the climb up, beware of tricky footings and crumbling staircases, or, once again, down you go. Elevators sometimes lend a lift, and tunnels provide shortcuts and temporary protection from the indigenous population.

In each game, you have three lives in which to work your demolition magic, although racking up points earns you bonus lives. If you make it intact all the way to the top within the time limit, a self-destruct sequence begins. The tower collapses and you ride off in your submarine to the next tower, merrily potting away at fish to earn bonus points

Each tower has a name, and the difficulty increases as you master each one. The game kindly gives you more time for the tougher towers. You begin with the Tower of Eyes, then go to the Realm of Robots, the Trap of Tricks, the Slippery Slide, the Broken Path, the Swimmer's Delight, the Nasty One, and, finally, end up at the Edge of Doom.

However much I like this game, it took me three weeks to get past the first tower, and just as I began to climb the second I got bumped off again. Of course, Dave will tell you I have an agility factor of 2. No doubt, you arcade groupies will have this one pegged in short order. Maybe.

The graphics are tops, both above and below the planet's viscous surface. The towers rotate with a convincing 3-D effect that can fascinate you into lousing up your turn. Hackers and other astute observers will note that your Kewpie doll/dragon/frog character does not actually go anywhere. Its movement and sense of progress are all created by the tower's rotation, but the programming is so smooth you feel as though you're actually moving.

There are some neat sound and music effects, too. My daughter, Meaghan, says the music distracts her, so she uses the sound off option. I find it helps me key in on certain enemies—like meandering mutant molecules that roam all over the planet, ready to shove you into the waste.

The game can be played by one or two players. High scorers get to post their initials, but, unfortunately, the game doesn't save them. There is a pause feature, fortunately, because once you use all three lives, you must start back at the Tower of Eyes if you want to continue playing.

I give *Tower Toppler* high marks for entertainment, great graphics, and just plain fun. Novice arcade players, whether youngsters or dithery moms like me, will find it easy enough to be rewarding, yet more skillful players will be challenged by *Tower Toppler's* tougher levels. The premise is uncomplicated and fun, and the graphics are good enough on a comic if not cosmic level that a slight suspension of disbelief is possible. As Destructo's top operative, I definitely won't blow away this game.

—Robin Minnick

Tower Toppler
U.S. Gold
Epyx
600 Galveston Dr.
Redwood City, CA 94063
$39.95

Demon's Winter

With all the fantasy adventures available for the 64, it can be tough telling them apart. To do well on the market, an adventure must have some distinguishing feature that sets it apart from the competition. *Demon's Winter* from Strategic Simulations (SSI) does just that. It has a flavor all its own and is a game you'll remember.

SSI, well known for it's war simulations, has left its mark on this excellent role-playing game. Tactical knowledge, as well as role-playing savvy, is needed to win. Gamers familiar with I.C.E.'s Rolemaster series will feel more than comfortable with the system. Others will have to spend some time with the game before they can understand the characters

SSI recommends that the manual be read thoroughly before playing the game. This is vitally important. And it's important to pay attention to details in *Demon's Winter*. Make a couple of mistakes when creating a character and the game could be impossible to win. Experienced gamers will have an easy time, but novice players might have some difficulty understanding how the game works.

After reading the manual, the next step is to generate your five characters from the ten classes available. The game is based on skills rather than on traits. A character with high marks in all traits will be worse than useless if his skills are poorly selected. Each class has access to different skills at different costs. For example, a Wizard would have trouble learning to use a sword, while a Ranger would find swords easy to wield but spells difficult to cast

> *Combat is where this adventure shines—it's no simple slugfest.*

Movement and exploration are fairly standard. Cities are simply rest points and are handled by menus rather than being mapped out. As in the Ultima series, all views are seen from the top, even the dungeons. The keyboard move commands are poorly laid out, but the joystick can be used. Start moving your party. Eventually you'll run across some unfriendly characters, and combat begins.

Combat is where this game really stands out. No simple slugfest here: You must maneuver your adventurers into striking position. How you hit, where you hit, and how far you have moved all affect how successful your attacks are.

The monsters aren't stupid, either. They pick their targets and go after them, with your spellcasters as primary targets. Spellcasters are important characters, with their ability to strike anywhere on the map. Care must be taken, though, as a misplaced spell can heal a monster or hurt one of your own party members. Look twice before casting and you'll save yourself a lot of trouble.

Religion also has its marks. There are several deities. While deities cannot give you spells, they can make definite impressions A call to your deity usually has no effect, but miracles occasionally happen. Examples include supercharging a spellcaster, rescuing the party from combat, or bringing a dead character back to life.

As your adventure progresses, you may be forced to cross large bodies of water. Combat on a ship is a different matter from land battle. While sailing the high seas, your own weapons and spells are unavailable. Instead, you must rely upon the ship's cannon. Like real-life smoothbore cannons, these are not terribly accurate, and cannonballs often head off into the sunset or into unintended targets. Flying hunks of lead don't discriminate: They hit the first thing they come to. Indeed, many times one pirate will fire at you only to hit another pirate ship. If you are hit, your ship suffers damage. Too many hits and she goes down with all aboard.

In the realm of magic, wizards have access to groups of spells. When a group is finally learned, the wizard has access to all the spells in that group, providing he has the power to cast them. Also, the potency of spells can be altered. For example, a 10-point Fire Storm will hurt many things, but a 50-point Fire Storm will destroy all but the most powerful creatures. Sorcerers can cast illusions, summon monsters to fight for you, and, by using possession, make the enemy fight itself.

The *Demon's Winter* package is presented very nicely. The manual is clear, detailed, and thoughtfully laid out. The program itself runs quickly, has minimal disk access, and provides two character sets, one for monitors and one for televisions.

The plot appears skimpy when you start to play, but it rapidly develops into an engaging conflict. I won't give away any more than that. While *Demon's Winter* may be too complex for the novice adventurer, it is an excellent product for the experienced gamer.

—Erik Olson

Demon's Winter
Strategic Simulations
675 Almanor Ave.
Sunnyvale, CA 94086-2901
$29.95

Combat Course

Computer war games are all around us these days. You can kill enemies in Vietnam, Korea, or downtown New York. The main character is usually a musclebound vigilante who was never in the army. *Combat Course* just might be where those war-game characters went to basic training.

This isn't your typical war game; in fact, it's not a war game at all. *Combat Course* is an army-style obstacle course that features barbed wire, explosives, hand-to-hand combat, and all the other things that make boot camp fun.

I always like looking at the disk directory of any new software I buy. That way, I can get a good idea of whether I can grab a soda or do some Christmas shopping while the program loads. The separate sections of *Combat Course* aren't long or numerous, but they do take a while to load on a 1541. Mindscape added a speed-loader to help things along. After all, you can't sit around wasting time when you're in the army.

Combat Course *just might be where war-game characters went to basic training.*

A few moments after you boot the disk, you'll see the title screen. To spare yourself the generic title music, press the space bar. Once into the game itself, you'll see screen divided: The lower third is the control panel; the upper two-thirds are divided into eight windows.

Your drill sergeant appears in window 1 (the upper left square). Window 2 displays any dangers: air raids, snipers, land mines, or Rex, the friendly attack dog. Dog tags for each player appear in window 3, and window 4 shows the various courses. Windows 5–8 are the actual playing screens.

The left half of the control panel is a display of a VCR (it's not a functional feature in the 64 version of the game). The right half of the control panel consists of eight buttons and three pads. Each button selects a different game option: see high scores, quit, enter names of players, play, save game, load game, top five players, and current top scores. After selecting any button, move below it and activate either of the two triangular pads to scroll forward or backward through the options, or press the fire button with the cursor over the rectangular pad to enter a change.

In gameplay, level 1 is Physical Challenge. You have 4000 time units to complete the course. In your way are barrels and sandbags to jump over, walls to climb, and horizontal ladders to swing across. At certain intervals, window 2 displays a trap. Traps consist of air raids, attacks by Rex the Combat Dog, or an order to stop and do ten pushups.

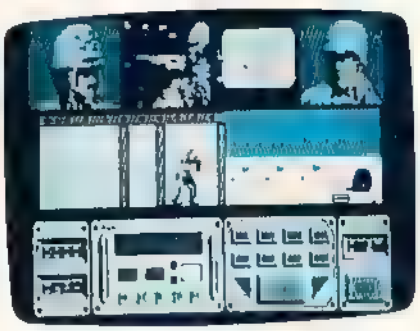
On a black-and-white screen, it's difficult to tell what each trap is. The background for window 2 is black, and Infogrames (the publisher) didn't lose a lot of sleep over the graphics. With color display, a definite improvement, the pushup figure still looks like a cockroach and Rex the Combat Dog still looks like an aardvark.

Level 2 is Risk Run. There aren't as many obstacles to jump on this level, but you'll be dodging bullets and hand grenades. Fortunately, you're armed with a rifle and have grenades you can throw back. You can also blow open doors with dynamite and gain some extra points. The graphics in window 2 are a bit better than those on the first level.

Level 3, Combat, is similar to Risk Run, but you get to fight in hand-to-hand combat. You also get to sneak up behind guards and blast away with machine guns.

Level 4 is a combination of the three previous levels. If you find one of the first three courses too easy, try Level 4.

The game includes a course construction set, but I had problems playing on the screens I created. I followed the instructions for loading my custom creations, but the original courses kept appearing. No big loss. The backgrounds don't connect, even if they were meant to. Seas can dead end at a desert, and mountains have cliffs coming off the rise.



The substantial manual contains instructions for all versions of *Combat Course*. Throughout the manual, you'll see special notes to Commodore users. Documentation is well written, especially for joystick control, which handles numerous functions in all phases of the game. (Remember Leroy's Cheatsheets? You'll need one to remember all the joystick controls.) *Combat Course* also offers keyboard control.

I think Infogrames/Mindscape could have done more with *Combat Course*. The graphics need work. The joystick response seems a little sluggish, and this adds to the frustration when you're trying to remember all the control combinations.

Combat Course offers combat challenges without gratuitous bloodshed, but it needs some work. There are plenty of war games on the market to keep you occupied until *Combat Course* has gone through basic training once more.

—Dan Wilson

Combat Course
Distributed by Mindscape
3444 Dundee Rd.
Northbrook, IL 60062
$34.95

G

SpeedScript 128 Plus

Michael Gruber

Here's a significant enhancement to SpeedScript 128 *—including new commands and other improvements.*

When *SpeedScript* for the 64 was first published in 1984, it offered many of the features of commercial word processors for the price of a magazine. With the debut of *SpeedScript 128* in October 1987, several modifications, including an 80-column display and a larger text buffer, improved *SpeedScript*'s usefulness.

SpeedScript 128 Plus adds even more features to *SpeedScript 128*. These enhancements include two customizable help screens, several types of tabs, more flexible header and footer commands, more powerful centering and justification commands, soft hyphenation, linking spaces, and a format ruler.

Upgrading Made Easy

SpeedScript 128 Plus is implemented as a patch to *SpeedScript 128*. This patch is written in machine language, so you'll need the 128 version of "MLX," the machine language entry program found elsewhere in this issue, to enter it. When MLX prompts you, respond with the values given below.

Starting address: 3A00
Ending address: 48F7

After you've entered the data, save the program with the name SPEEDPATCH 128. Quite a few changes had to be made to *SpeedScript 128* to add the new features. Making the changes manually would be time-consuming. To make upgrading as easy as possible, the patch program enhances *SpeedScript 128* automatically.

To upgrade *SpeedScript 128*, turn off your computer. Then turn it back on and enter the following lines:

DLOAD "SPEEDSCRIPT 128"
(Load *SpeedScript 128*, but don't run it.)

BLOAD "SPEEDPATCH 128"
(Load the patch program.)

BANK 0:SYS 18212:BSAVE"SPEEDSCRIPT 128+",B0,P7169 TO P17927:BANK 15

(Install the new commands and save the resulting program with the filename SPEEDSCRIPT 128+.)

The new program loads and runs just like the original *SpeedScript 128*, plus it has the modifications mentioned below.

First Things First

In order to use *SpeedScript 128 Plus*, you'll need a copy of *SpeedScript 128*, along with the program's documentation. If you don't have a copy of *SpeedScript 128*, you can obtain one by ordering the *COMPUTE!'s SpeedScript* disk. (*SpeedScript 128* also appeared in the October 1987 issue of *Gazette* and is on that issue's companion disk). The *COMPUTE!'s SpeedScript* disk contains *SpeedScript 128* as well as the 64 version, along with a number of support utilities for both word processors. Documentation is included for all programs on the disk. For information on ordering this disk, see the advertisement found elsewhere in this issue.

Instant Help

One penalty of having a program with a large repertoire of features is the need to remember a multitude of control codes and special function keys. You find yourself frequently consulting manuals, articles, or custom-made "cheat sheets."

To alleviate this problem, *SpeedScript 128 Plus* gives you two help screens, which you can customize. Press **HELP** to view the first help screen; press it again to view the second help screen. You can continue to flip between the help screens by pressing HELP. Press any other key to return to the main screen.

To take advantage of the help feature, you must create your own help screens. To create a help screen, load and run *SpeedScript 128* (any version). Set the display for 80 columns (press **CONTROL-W**, and then enter the number 79 at the prompt). Now type in the information you that want to show on the screen exactly as it is to appear.

The help screens are displayed using the extra 80-column display memory not used by *SpeedScript*. Consequently, there is no automatic word-wrap, and every character space must be filled. This means that spaces must be used to fill each line to the end. You can verify that a line is full by moving the cursor across the line. If the cursor moves to the beginning of the next line before it reaches the right edge of the screen, that line isn't entered correctly. Add spaces all the way to the right edge of the screen.

Figure 1. Sample Help Screen for Text-Editing Commands

CONTROL-A	Change case	CONTROL-C	Check Spelling
CONTROL-D	Delete (S,W,P) behind cursor	CONTROL-E	Erase (S,W,P) in front
ShftCTL-E	Erase without buffer clear	CONTROL-G	Global search and replace
CONTROL-H	Hunt	ShftCTL-H	Select HUNT phrase
CONTROL-I	Insert 5 spaces	CONTROL-J	Replace
ShftCTL-J	Select replace phrase	CONTROL-K	Kill buffer
CONTROL-L	Change text color	CONTROL-P	Print
ShftCTL P	Print Screen,Disk,Printer	CONTROL-R	Restore buffer
CONTROL V	Verify	CONTROL-W	Select screen width
CONTROL-X	Exchange two characters	CONTROL-Z	Go to end of text
CONTROL-=	Display free memory	CONTROL-4	Display disk directory
CONTROL-↑	Send disk command/read error	CONTROL-3(£)	Enter format command

HELP	Show help screens	ALT-HELP	Show ruler		
TAB	Insert 5 spaces	ESC	Toggle INSERT mode	RESTORE	Exit to basic
RUN/STOP	Insert 255 spaces	Sh-R/S	End paragraph	Sh-CLR/HOME	Erase all
<-	Backspace	CTL<-	Erase right	ShCTL<-	Erase spaces
CLR/HOME	Top of screen	CLR/HOME x2	Top of text	INST/DEL	Delete left

F1	Next word	F2	Previous word	Curs UP	Previous sentence
F3	Next sentence	F4	Previous sentence	Curs DOWN	Next sentence
F5	Next paragraph	F6	Previous paragraph	Curs LEFT	Move left
F7	Load from disk	F8	Save to disk	Curs RIGHT	Move right

Figures 1 and 2 show example help screens to get you started. Notice that all 25 lines are available, including the two top lines normally reserved for use by *SpeedScript*.

When you've finished entering a help screen, save it to the disk containing *SpeedScript 128 Plus*. Use the filename HELP1 for the first help screen and HELP2 for the second help screen. If the help files aren't present when you first run *SpeedScript 128 Plus*, the program displays a message requesting that you insert a disk with the help files or abort. If you abort, the program continues normally. Thereafter, if you press the HELP key, the message *No help screens in memory* appears.

To add the help screen feature after you've run *SpeedScript 128 Plus*, exit the program and run it again.

The Format Ruler

When you run *SpeedScript 128 Plus*, you'll find that the top line separating the *SpeedScript* messages from the text area has been changed to a ruler showing minor subdivisions for each character and major subdivisions every five character positions. This ruler makes it easier to lay out tables and line up text.

In addition to marking character positions, the ruler can display formatting information. Pressing the ALT and HELP keys simultaneously (**ALT-HELP**) causes *SpeedScript 128 Plus* to clear the screen and display justification, line spacing, and header/footer information. Justification and header/footer information are displayed graphically. The justification mode is represented by a graphic image on the upper left side of the ruler. The image is smooth on the left, right, or both sides depending on the current justification mode. For example, if only left justification is set, the image will be smooth on the left side and ragged on the right.

The graphic image on the upper right of the ruler indicates whether or not a header or footer is defined at the current cursor location. A line at the top of the image indicates that a header is defined; a line near the bottom indicates a footer. Finally, the spacing setting is displayed in the top center of the ruler and is shown as *s #*, where # is the spacing.

The ruler also shows the location of the left and right margins (triangles) and any tabs that are in effect (diamonds). If the right margin is beyond the right edge of the ruler, a reverse arrow is displayed at the edge of the ruler.

The ruler displays the formatting settings that are in effect at the cursor's current position. It can be updated at any time by positioning the cursor at a new location and pressing ALT-HELP.

To return to the main text screen from the ruler display, press any key.

New Formatting Commands

The features described so far are aimed at making *SpeedScript* easier to use. The most significant enhancements, however, are the new printer commands.

The first printing command added by *SpeedScript 128 Plus* is full justification (both right and left edges are aligned). You can toggle full justification on or off by pressing **CONTROL-£** (or **CONTROL-3**, which is easier to do with one hand) and then **v**. (You'll see a *v* inserted into your text in reverse video.) Full justification works at all margin settings and correctly handles the last line of a paragraph, independent of its length.

By default, *SpeedScript 128 Plus* left-justifies text, but it also supports centering, right justification, and full justification. In previous versions of *SpeedScript*, right-justification and centering commands remain in effect until a carriage return is encountered. With *SpeedScript 128 Plus*, these commands remain active until they're turned off. To turn off a justification command, enter the same command used to turn it on. When multiple justification codes are in effect, the order of precedence is full justification, centering, right justification, and then left justification. ▹

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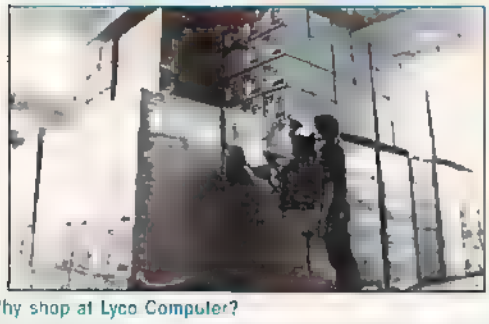

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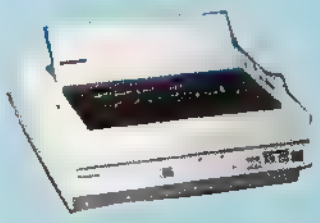

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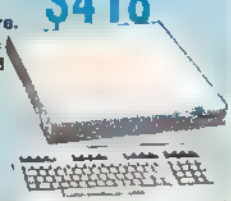

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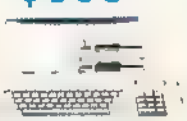

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Figure 2. Sample Help Screen for Printer Commands

FORMATTING COMMANDS

These commands are all preceded by <CONTROL-3> or <CONTROL-£>.

COMMAND	DEFAULT	COMMAND	DEFAULT
a True ASCII	off	n Forced paging	
b Bottom margin	58	p Page length	66
t Top margin	5	c Centering	toggles
r Right margin	75	e Right-justified	toggles
l Left margin	5	v Full-justified	toggles
s Line spacing	1	f Footer	
g Link file (drive#:filename)		h Header	
w Single-sheet print		i Information - not printed	
x No. of columns	80	j Add LF after CR	off
@ Initial page #	1	? Start page for print	1
m Margin release	off	# Print page number at this point	

SPECIAL COMMANDS

- Soft hyphen, printed only at end of line
- <space> Linking space, prevents splitting of words

TAB COMMANDS

- ! Set tab locations
- " Normal tab
- (Shift ↑) Right-align tab
- . Decimal tab
- * Define tab lead character

HEADER/FOOTER COMMANDS

- : Field delimiter, divides left-, center-, and right-aligned fields
- ← (left arrow) End of line in multiline header/footer

Full justification is accomplished by adding spaces between words to pad out a line. Unless care is taken, the presence of a long word at the end of a line which does not fit within the margins can lead to a very unattractive line. To a lesser extent, the same is true of normal left justification. Hyphenation of long words helps to minimize these effects, but it requires careful attention to margins during text input and must be redone when text is edited. *SpeedScript 128 Plus* adds a soft hyphen to deal with this problem more effectively.

Soft hyphens help prevent large gaps at the end of lines by splitting large words that occur at the line break. To enter a soft hyphen, determine where a word should be broken and press **CONTROL-£**, followed by **-** (normal hyphen) to insert a hyphen. The effect of a soft hyphen is that, during printout, the word will be hyphenated only if it appears at the end of a line.

Occasionally, the opposite effect is desired: words separated by one or more spaces should not be split across separate lines. For example, the word *SpeedScript* and the number *128* in the name *SpeedScript 128* are best kept on the same line. *SpeedScript 128 Plus* allows you to force multiple words to always appear on the same line with linking spaces. These spaces are printed as normal spaces, but appear to the word-wrap logic as nonspace characters. To enter a linked space, press **CONTROL-£** followed by **SPACE**. In the text display, the linked space will appear as a reverse space.

Tabbing

SpeedScript 128 Plus supports three kinds of tabs: left-aligned, right-aligned, and decimal. The same command is used to set the tab positions for all three tab types. To set a tab, press **CONTROL-£** followed by **!** (exclamation point). Next, enter the column numbers where you want tabs. Separate the columns by commas. For example, the command

! 25,40,65

sets additional tabs at columns 25, 40, and 65.

If you want to clear previous tab settings, the first number of the tab command should be 0. You can set up to 16 tab positions. The ruler display is useful for setting tabs and checking tab positions anyplace in the text.

The first tab type, the normal tab, aligns text so that it starts at the next tab position. This type of tab is entered with **CONTROL-£**, followed by ↑ (up arrow). The next type, the decimal tab, is entered by **CONTROL-£**, followed by **.** (period). As the name implies, this tab aligns the text so that the decimal point is located at the next tab position. This kind of tab is most useful for lining up numbers on the decimal point.

The final type of tab, right-alignment, aligns text so that the right edge of the text is aligned with the next tab position. You can set this type of tab with **CONTROL-£** followed by **SHIFT-↑** (shifted up arrow). The text for this type of tab must be followed by a normal tab or a carriage return.

Tabs can be preceded by an optional leading tab character. This character will be printed repeatedly on the line from the end of the text prior to the tab to the beginning of the text at the tab. These characters are useful in building tables or charts. The leading tab character command is entered by pressing **CONTROL-£** followed by * (asterisk).

If you want to define a leading character for a tab, place the leading tab character command after the tab command but before the text to be tabbed. Any printable character can be used, but a period or hyphen is the most common. Following are a few example tab commands, along with the output for each.

A normal tab onscreen:

Chairman ▪ John Smithson
Vice Chairman ▪ Peter Doe

The printed result:

Chairman John Smithson
Vice Chairman Peter Doe

A normal tab with leader onscreen:

Chairman ▪. John Smithson
Vice Chairman ▪. Peter Doe

The printed result:

Chairman . . . . . John Smithson
Vice Chairman . . . . Peter Doe

A right-aligned tab with leader onscreen:

Chairman ▪-John Smithson
Vice Chairman ▪-Peter Doe

The printed result:

Chairman ---------- John Smithson
Vice Chairman ---------- Peter Doe

A decimal tab with leader onscreen:

item1 ▪ 455.55
item2 ▪ .33.30

The printed result:

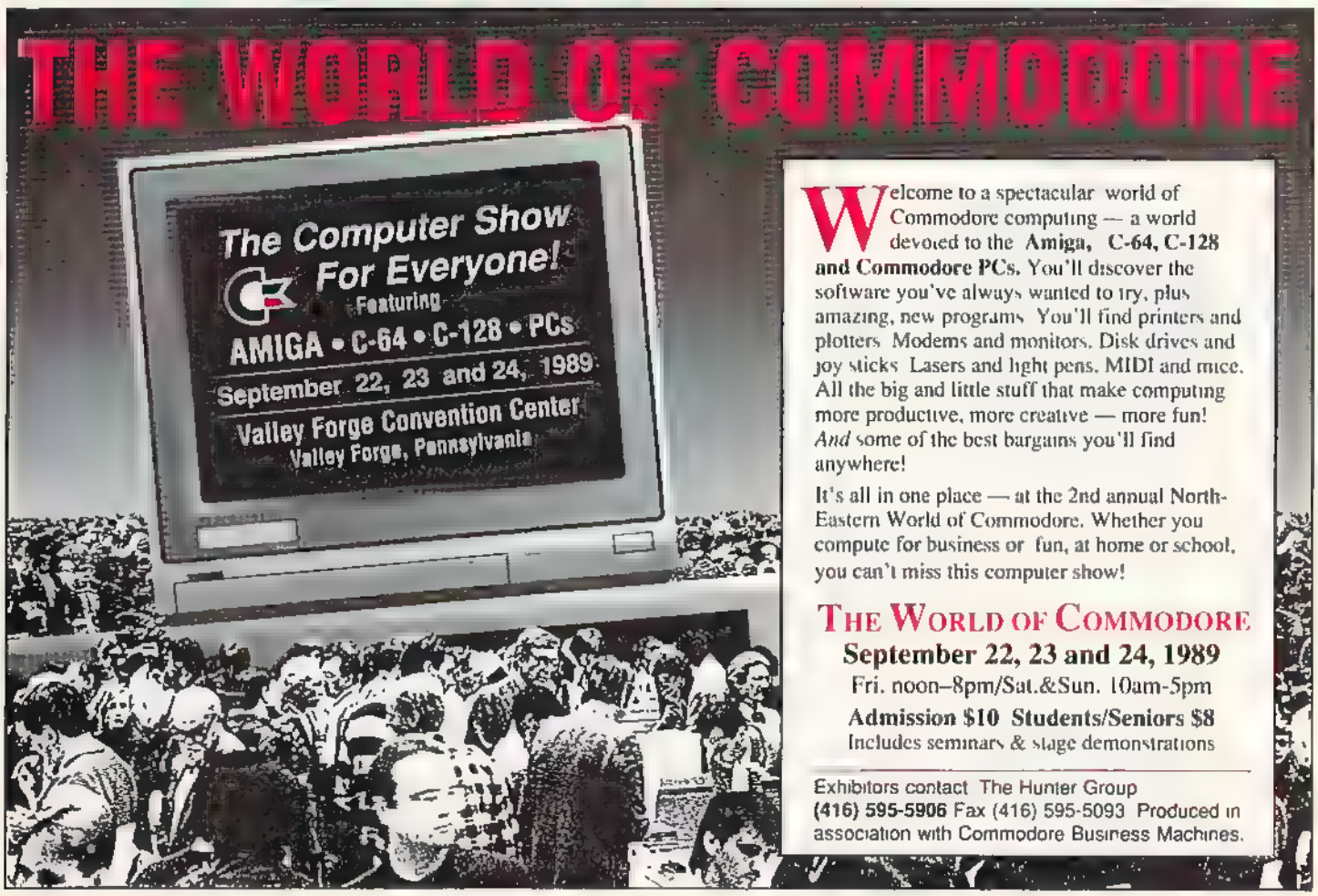
item 1..... 455.55
item 2... ..... 33.30

New Header and Footer Commands

SpeedScript 128 Plus extends the options available in headers and footers. In particular, it allows you to set header and footer margins that are independent of text margins, to select the lines where the headers and footers are printed, to use multiple line headers and footers, and to left-justify, center, or right-justify the text within each header or footer line. The amount of space between headers and footers and the main text can also be varied as part of the header and footer. Because most of the changes are common to both headers and footers, the description below focuses on headers. Unless otherwise stated, features which apply to headers also apply to footers.

To set the margins for a header, use the normal header command followed by the command for the left margin and right margin as you would use them in the main text. Do not enter a carriage return after the margin settings. Simply continue with the header text. You can also set the spacing between the end of the header and the start of main text (or between the end of main text and the start of the footer). Set the space between the header and main text by pressing **CONTROL-£** followed by **s** and the number of lines to skip. The default value for this parameter is 2.

To preserve compatibility with previous versions of *SpeedScript*, the commands to set the top and bottom margin have been retained, but the meanings have been changed slightly. The top-margin command has been changed to designate the location of the header instead of the start of main text. This value, plus the spacing value specified in the header, determines where the main text will begin. If there is no header, the top margin indicates the start of main text. The bottom-margin com-



mand continues to specify the location of the bottom of the main text. These parameters and the spacing parameters in headers and footers must be chosen carefully to obtain a good page layout. To help make designing pages easier, the screen-preview option now has a line designating the end of a page.

With *SpeedScript 128 Plus*, headers and footers can be longer than one line. To create a multiple-line header, type each line of the header as you normally would, but instead of ending the line with a carriage return, press **CONTROL-£** followed by ← (left-arrow). This will appear on the screen as the end-of-paragraph symbol in reverse.

The header can be as many lines long as you wish, as long as the entire header, including control codes, doesn't exceed 256 bytes. The lines of the header are printed with single-spacing. If you need a double-spaced header, insert blank lines between the text lines. Each line of a header can have a different margin setting. If the margins are not specified, they default to the values set in a previous header or in the main text.

In addition to allowing longer headers, *SpeedScript 128 Plus* divides each header line into three fields. These fields are defined by two separator characters. You can enter a separator by pressing **CONTROL-£** followed by : (colon). The text preceding the first such separator starts at the left margin of the header line; the text between the first and second separators is centered between the left and right margins; and the text following the second separator is aligned with the right margin.

If one of the fields is to be empty, separators must still be used as place holders. For example, if you want to place the title of a paper on the top right of each page, you would enter a command similar to the following:

```
h:: Title
```

If you have multiline headers, each line of the header is divided into three fields, each with its own separators.

To Err Is Human

No article can adequately describe all the combinations of commands available in *SpeedScript 128 Plus*. The reader is therefore encouraged to experiment. Try a combination of commands and then test them using the print preview option. To help minimize errors, *SpeedScript 128 Plus* has some simple error checking, particularly in formatting headers and footers.

If an error occurs, the program prints a warning message on the command line and gives you the option of aborting or continuing to print. If the output is not aborted, *SpeedScript 128 Plus* handles the errors so that their impact is minimized. For example, if header or footer fields overlap, *SpeedScript 128 Plus* prints the error message WARNING: H/F FORMAT IMPOSSIBLE – CHECK FIELDS. If you elect to continue printing, *SpeedScript 128 Plus* truncates the fields to avoid the problem. If you choose to abort, the program returns to the editing screen.

See program listing on page 93. **G**

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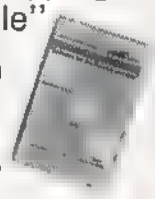

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EZ BAR CHARTER

Tim Ruiz

Get a better perspective on numerical data by graphing it with this simple vertical bar chart routine. For the Commodore 64, 128, Plus/4, and 16. Commodore or Commodore-compatible printer required.

There's nothing quite like a bar chart for showing trends and patterns in a clear, concise manner. Complex numbers can be depicted graphically as a series of peaks, valleys, and plateaus that can be analyzed at a glance. For this reason, the bar chart is a popular tool in a number of disciplines.

For those who are not that familiar with making bar charts, "EZ Bar Charter" is a good place to start. It plots up to eight data items on a vertical bar chart and outputs the resulting graph to the screen or a printer. And EZ Bar Charter works equally well on the Commodore 64, 128, Plus/4, and 16.

Getting Started

EZ Bar Charter is written entirely in BASIC. To ensure accurate typing, enter the program using "The Automatic Proofreader," found elsewhere in this issue. Be sure to save a copy of the program to tape or disk when you've finished typing it in. To graph some data, load the program and type RUN.

EZ Bar Charter prompts you for the range of the data that you wish to graph. You're offered three choices: 0–40, 0–100, and 0–200. After you've made a selection, the program asks for the number of items that you intend to graph. Enter a number from 1 to 8.

The screen will clear and another prompt will appear. Enter a three-character label and a value for each item to be graphed. When you've entered all the data, the program will request a label for the graph. Enter up to 25 characters.

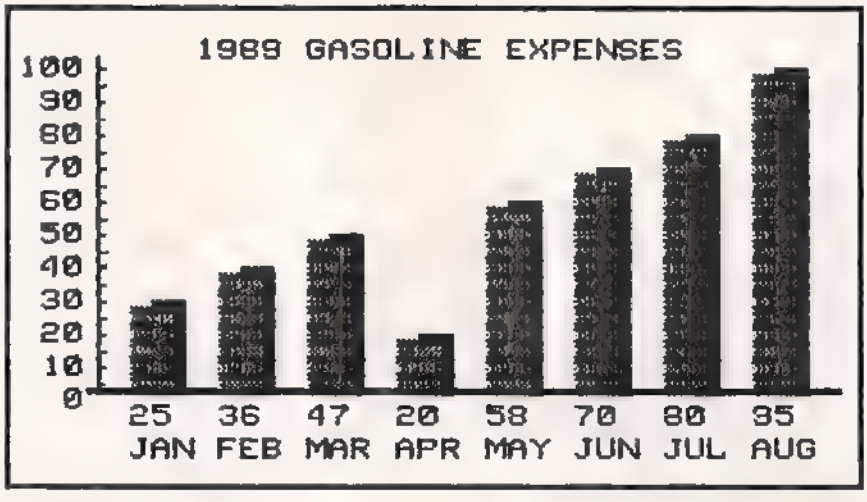
The program then displays the data you've entered and asks if it's correct. If there's a mistake in the data, press N (for No) and reenter it. Otherwise, press Y (for Yes). EZ Bar Charter scales the graph and plots the data on the screen. Each item that is plotted will appear along with a value at the bottom of the graph.

Press any key. A final prompt will appear below the bar chart. To print the graph on a Commodore or Commodore-compatible printer, put your printer online; then press P. (If you send the graph to the printer and get a ?DEVICE NOT PRESENT error, put the printer online; then type CLOSE 6:GOTO 280 from direct mode to plot the data.) To create another graph, press A.

An Example

One practical use of EZ Bar Charter is with household budgeting. Suppose you wanted to compare the amounts you had spent on gasoline for the first eight months of 1989. You could itemize your gas expenses and plot the total amount spent each month.

For example, let's say gas cost you $25 in January, $36 in February, $47 in March, $20 in April, $58 in May, $70 in June, $80 in July, and $95 in August. Since your monthly gas expenses are in the range $0–$100, you would specify option 2 (0–100) at the program's initial prompt. After you entered the data for the six-month period, EZ Bar Charter would produce the graph shown in the accompanying figure.



Besides using EZ Bar Charter for home budgeting, you might want to excerpt the graphing portion of the program for use in your own programs. If so, the actual graphing routine is in lines 480–730.

See program listing on page 92. **G**

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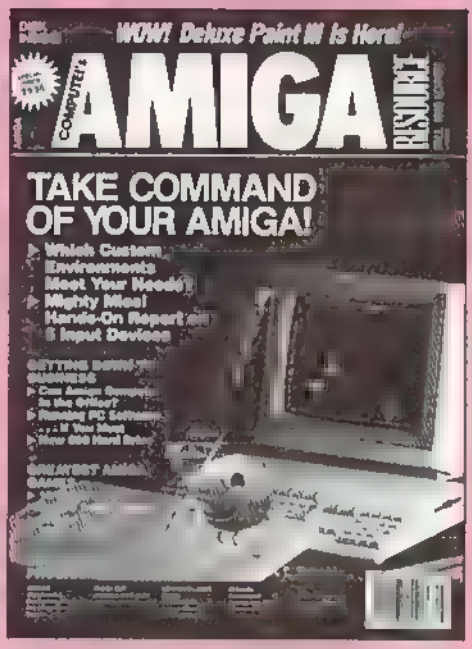

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MR Scribble

Create colorful medium-resolution graphics screens with this fast and easy-to-use drawing program for the 64. "MR Scribble" is ideal for young children. Disk drive and joystick required.

John Fedor

The Commodore 64 offers a low-resolution text screen (40 × 25) and a high-resolution bitmapped graphics screen (320 × 200), but offers nothing in between. On this machine, there's no such thing as a medium-resolution mode.

"MR Scribble" (or Medium-Res Scribble), a simple drawing program, simulates an 80 × 50 medium-resolution screen by using standard Commodore graphics characters. Each character cell is divided into four blocks, giving you four times the resolution of the text screen while using the same amount of memory. The result is a program that's great for designing title screens and mazes or for just doodling around.

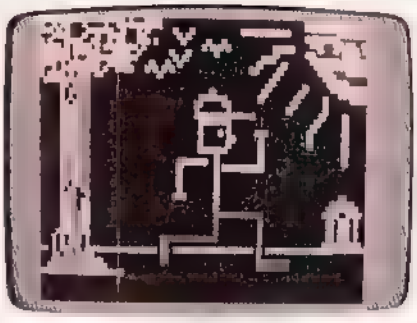
Getting Started

MR Scribble is written in machine language. Type it in using "MLX," the machine language entry program found elsewhere in this issue. When MLX prompts you, respond with the values given below.

Starting address: C000
Ending address: C44F

Enter the data for MR Scribble. Be sure to save a copy of the program to disk with the name MR SCRIBBLE before you exit MLX.

When you're ready to run the program, plug a joystick into port 2 and load the program with the command LOAD"MR SCRIBBLE",8,1. After the program has loaded, type NEW and SYS 49152.



With its block graphics and choice of colors, "MR Scribble" is an ideal doodling program for children.

A black screen with a black border and a blinking cursor will appear. The draw color is the same as the current border color. Press B to change the draw color; to change the background color, press SHIFT-B.

To draw, position the cursor using the joystick. Then hold down the fire button and move the cursor. To erase, place the cursor over a previously drawn block. Then hold down the fire button while moving over the area you want erased.

Although you can have the 16 standard Commodore colors on the same screen, each character cell is limited to two colors.

Buffer and Disk Storage

MR Scribble allows you to store screens to memory or to disk. Press f1 to store the current screen to a memory buffer. To retrieve it from the buffer, press f2.

Press f8 to save the current screen to disk. The program will prompt you for a filename; enter up to eight characters. If you type in fewer characters, the program will add spaces to the end of the filename so that it's eight characters long.

After you've entered a filename, press RETURN. MR Scribble saves your screen as two separate files. One file, which uses the extension .S, contains the actual graphics data. The other file, which uses the extension .C, contains the color data for the screen.

To reload a screen from disk, press f7 and enter a filename. Be sure the disk in the drive contains the files for this screen.

You can also load screens you've saved from MR Scribble into your own programs. The following example shows how to load a screen called SDEMO (notice that the filenames include the three spaces added by the save command):

```
10 IF A=0 THEN A=1:LOAD
   "SDEMO    .C",8,1
20 IF A=1 THEN A=2:LOAD
   "SDEMO    .S",8,1
30 POKE 53280,background color:POKE
   53281,border color
40 GOTO 40
```

Once the screen has loaded, you can use the PRINT statement to place text on it.

To exit the program and return to BASIC, press RUN/STOP–RESTORE. To restart the program, type SYS 49152.

See program listing on page 81. G

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feedback

Do you have a question or a problem? Have you discovered something that could help other Commodore users? We want to hear from you. Write to Gazette Feedback, COMPUTE!'s Gazette, P.O. Box 5406, Greensboro, North Carolina 27403. We regret that, due to the volume of mail received, we cannot respond individually to programming questions.

Hold on to Your 64 and 128

I currently own a 128D but am thinking of upgrading to an Amiga. However, I have a lot of 64 software that I don't want to give up. I was wondering if there's a product that would make an Amiga compatible with the 64

James Rosenbaum
Spokane, WA

There are two Amiga products that claim to run the 64's programs: The 64 Emulator II *from Readysoft (P.O. Box 1222, Lewiston, New York 14092) and* GO-64! *from Software Insight Systems (16E International Drive, East Granby, Connecticut 06026). Both emulators come with a hardware device that allows you to connect a 1541/1571 disk drive to your Amiga via the parallel port. (Actually, this connector is optional on* The 64 Emulator II, *but highly recommended.)*

If you purchase a used Amiga 1000, the GO-64! *emulator requires a special cable that converts your parallel port to be compatible with the 500's and the 2000's port. There are two different disk drive interfaces for* The 64 Emulator II*—one for the 1000 and one for the newer model Amigas. You'll need this hardware device in order to load 64 software from disk.*

*Essentially, these emulators are 64s on a disk. In conjunction with your Amiga computer, they translate each instruction and video and audio command into a job for the Amiga (*GO-64!*, by the way, does not support audio.) This translation takes a great deal of time. The 68000 microprocessor in the Amiga is far faster and more powerful than the 6510 in the 64, but it's not up to the task of playing the part of a real 64 at full speed. Overall, the 64 is about four times as fast as either of these two emulators.*

To see just how 64-compatible these emulators are, we tested several popular programs on both emulators with mixed results. Both products were able to run GEOS, with The 64 Emulator II *running it a bit faster.* SpeedScript *ran on* The 64 emulator II, *but not on* GO-64!. *"MetaBASIC" (February 1987* Gazette*), a popular BASIC programming utility, would not run on either. If you have specific software that you want to run on your emulator, be sure to try it out at a computer store first.*

Overall, the performance of both of these products is disappointing. Plainly stated: You need a 64 to run 64 software. If you decide to buy an Amiga and want to retain your 64 software investment, keep your 64—there's simply no substitute.

Strip Programs

When home computing was in its infancy, there was a lot of talk about strip charts—vertical strips of bars (like the Universal Product Code symbols found on retail goods) which help to enter programs. These strip charts would have eliminated typing errors.

The idea faded quickly. Or is it still used quietly in some corner of the consumer market?

C. J. Abbot
Hempstead, NY

Program strips were one of the many great ideas that never caught hold. The idea was simple: Type-in programs in magazines would be replaced by the compact strip charts. Owners with strip readers could simply pass an optical wand over the coded bars for a program. No more typing, no more errors.

Strip readers were caught in a Catch-22 situation. Computer-magazine readers, strapped for cash (remember how much home computers and peripherals cost in the early 1980s), weren't willing to lay down money for the strip readers because there were so few programs listed in strip format. Editors of computer magazines weren't willing to print the strips until enough of their readers could use them. The death knell for strip readers sounded when inexpensive disk drives and magazine disks like Gazette Disk *arrived.*

As far as we know, there are no strip readers being used for program *entry. However, there are strip readers being used for* data *entry. They are used to sort mail, checks, and other documents. You might even find a relative of the strip reader—the laser UPC reader—in your local grocery store.*

Another BASIC Editor Revisited

In the June 1989 "Feedback," reader D. R. Cool wanted to convert a *SpeedScript* file into a BASIC program. You responded with a conversion program that used the dynamic-keyboard technique. Here's an alternate method that your readers may like to try.

First, enter the BASIC program from within *SpeedScript* following the rules provided in the "Feedback" response (line numbers for each program line, less than 80 characters per line, end each program line with a carriage return, and enter control characters as format commands). End the program with a blank line and the word *ready*.

Next, save the file in sequential form by printing it to disk (press P while holding down the Commodore and CTRL keys; then press D at the prompt *Print to: Screen, Disk, Printer?*). With the sequential file on

the disk in drive 8, enter

```
OPEN 1,8,8,"sequential filename"
```

Then, clear the screen and enter the following line at the home position:

```
POKE152,1:POKE780,0:POKE781,1
  :SYS65478:POKE631,19:POKE632
  ,13:POKE198,2
```

The SYS command in this line calls the Kernal routine CHKIN, which makes file number 1—the file that you've opened—the input channel. Data from this file is then read into the input buffer a byte at a time. When the carriage return—CHR$(13)—at the end of the first program line is detected, the computer enters the line into memory as if it were typed in from the keyboard.

Normally at this point, BASIC 2.0 thinks the file is no longer open and stops reading data. To read in the next program line, we place the cursor over the line containing the SYS command and execute a RETURN (using the keyboard buffer at location 631). At the same time, we POKE a 1 into location 152, telling the computer that the sequential file is still open.

When the entire program has been placed in memory, the *ready* at the end of the file will be interpreted as READ Y, causing an OUT OF DATA error. When you see the error message scroll by, press RUN/STOP–RESTORE to halt the read process.

On the 128, the conversion procedure is a little easier. Just enter the following two lines:

```
OPEN 1,8,8,"sequential filename"
SYS 65478,0,1
```

James Greek
New York, NY

Indeed, an interesting approach. Thank you for this contribution.

Giving the 128 Character

I own a Commodore 128 and have been trying to create a custom character set to be CHARed onto the multicolor bitmapped screen (the regular characters appear distorted). I figured I could put my 512-byte character set at memory locations 15360–15871. Is this possible? I've succeeded in creating a character set for the regular screen, but when I introduce the GRAPHIC command, the ROM set is displayed. Is there another place I could put my character set data within the first 16K? Below is a portion of my program:

```
10 POKE217,4:POKE2604,PEEK(2604)
   AND240OR15
20 GRAPHIC 3,1
30 FORI=15360TO15871:READX
   POKEI,X:NEXT
40 CHAR 1,20,20,"A"
50 REM CHARACTER DATA
60 DATA ...
```

R. Thinggaard
Newark, CA

The 128's hi-res screen uses the last 9K of memory within the first 16K of bank 0 RAM (7168–8191 for color and 8192–16383 for the bitmap). Placing your character definitions at 15360 puts them on the bitmapped screen—obviously not what you want.

Of the 7K of memory not used by the hi-res screen, there is 2.25K of memory left for your character set (4864–7167, room for 288 characters). If you were going to print your text on the normal text screen, you'd have to tell the VIC-II that the character set was at 4096 (character sets must begin on a 2K boundary for the VIC-II to use them correctly) and use only the reverse characters (otherwise, you'd overwrite part of BASIC's workspace with your character set). Since you want to place your text on the multicolor bitmapped screen, you can be more flexible.

Character sets used by CHAR must begin on a page boundary. (A page is 256 bytes of memory, so a page boundary is an address that is evenly divisible by 256.) The CHAR command uses memory locations 4587 and 4588 to locate the upper-/lowercase and uppercase/graphics character sets, respectively. These locations contain the page number of the beginning of the character set. To locate your character set at 4864, put a value of 19 (4864 / 256 = 19) in location 4588.

There are a couple of interesting things about the CHAR command that you should note. First, CHAR doesn't use the reverse characters in the character set when you set the reverse flag. Instead, CHAR inverts the character pixels itself. For some applications, this can effectly double the number of available characters. Secondly, CHAR tries to print characters in one color on both the hi-res and multicolor bitmapped screens. This causes the characters to be distorted when printed on the multicolor bitmap. The easiest way to get around this problem is to set the graphics mode to hi res before you use the CHAR command and then set it back to multicolor.

The following short example demonstrates how to set up a custom character set on BASIC's GRAPHIC 3 screen:

```
KX 10 POKE4588,19:COLOR1,2:COL
      OR2,4:COLOR3,8:GRAPHIC3,
      1
GP 20 FAST:FORA=0TO1023:BANK14
      :B=PEEK(53248+A):BANK0:P
      OKE4864+A,B:NEXTA
MQ 30 FORA=0TO31:READB:POKE486
      4+A,B:NEXTA:SLOW
QM 40 GRAPHIC1:CHAR1,0,0,"@ABC
      DEFGHIJKLMNOPQRSTUVWXYZ"
      :GRAPHIC3
FA 50 GETKEY A$:GRAPHIC0:END
BS 60 DATA0,20,20,20,20,20,20,
      0
GM 70 DATA85,65,65,65,65,65,65
      ,85
DF 80 DATA170,190,190,190,190,
      190,190,170
XD 90 DATA255,235,235,235,235,
      235,235,255
```

Line 10 sets the screen mode and colors and tells CHAR where to find the character set. Line 20 copies the first 128 characters from the ROM character set to 4864. Line 30 redefines the first four characters in the set. Line 40 prints some characters, including the ones we redefined, on the multicolor bitmapped screen. And finally, line 50 gets a keypress and returns you to the normal text screen.

SpeedScript 128 Plus

I use *SpeedScript 128* constantly, and, in general, I've been very pleased with it. Occasionally though, I need a tab function. So far, I've been unable to come up with a series of commands that will produce the desired effect. Do you know of any way to set this up? If not, do you plan to publish an upgrade to *SpeedScript 128* with this capability?

Walter D. Cornell
Mishawaka, IN

Your timing is excellent. We just received a "patch" for SpeedScript 128 *which includes a tab function. This program*—SpeedScript 128 Plus—*appears in this issue.*

In addition to tabbing, this enhanced program features help screens, multiple-line centering, full justification, soft hyphens, linking spaces, more flexible header and footer commands, and a character ruler display that shows text-formatting information. **G**

BASIC for beginners

Nintendo vs. 64: Another View

Larry Cotton

I'd like to take this month to bypass BASIC tutoring and climb up on my soapbox. I've been a regular columnist for *Gazette* for the past three years, but I've voraciously read almost every word in every issue since the magazine debuted in July 1983. Lately, I've been especially intrigued by the discussions in Fred D'Ignazio's columns ("D'Iversions") in which the 64 and Nintendo face off. As a longtime Commodorian, I'd like to present my view. I've owned, promoted, and actively programmed Commodore 64 computers for almost eight years now, so my opinion is not exactly unbiased.

What Strategy?

Ever since Jack Tramiel abandoned ship for Atari, Commodore has exhibited absolutely no perceivable marketing strategy. Whatever coups it may have claimed seem only to be fortuitous accidents. I know that Commodore is second only to IBM in Europe, but, somehow, this still doesn't make me feel any better.

As most readers are probably aware, the upward- and downward-evolving Amiga was originally designed by another company altogether; Commodore bought it from them and then didn't know quite what to do with it. Incredibly, one gets the impression it's sold more by word of mouth among artists and musicians than by any other means.

The 128 and 128D—really breakthrough computers when they were introduced—were marketing fiascos from the outset. Commodore had a good idea to feature 64 compatibility, just as IBM has always ensured that its newest offerings would run the older software. Including the CP/M operating system was more than just an afterthought, but it may have actually contributed to Commodore's reported decision to drop the 128D. (The 128 was discontinued some time ago.)

As for the relatively new 64C—a repackaged 64 with only a much better user's manual going for it—well, thank Berkeley Softworks' GEOS for injecting an aging computer with a lifesaving transfusion. One can only conclude that Nintendo has dominated the game-machine market by default. Commodore isn't pushing its products properly.

For advertising purposes, it would be a piece of cake to compare the Nintendo and 64 in a side-by-side chart, but have any of you ever seen such a comparison? Under Tramiel's leadership, Commodore compared the six-hundred-dollar 64—favorably—with the Atari 800 and, believe it or not, the IBM PCjr, among others. Hundreds of companies today use this same strategy in their advertising, using competing product names; there's nothing wrong with that. If Commodore and Nintendo features were laid side by side, there just wouldn't be any comparison.

Thank the prolific, creative software developers—not Commodore—for keeping the 64 alive. If it had been solely up to the Commodore marketeers, they would have dropped the 64 long ago. In favor of what? The 128? The 128D? The Amiga? I don't think even Commodore knows.

Berkeley Softworks, Electronic Arts, SSI, Accolade, Epyx, Sub-LOGIC, Springboard, Timeworks, Mindscape, and many others have helped keep the 64 alive and kicking by providing quality software that, in my opinion, has the potential of blowing away the Nintendo in terms of superior graphics, sound capabilities, and, most important of all, player involvement.

And don't forget *COMPUTE!'s Gazette* and other Commodore-specific magazines. OK, I'm biased in this respect, too, but *Gazette* has been, and continues to be, a tremendously valuable asset to Commodore.

Would Commodore admit they've just plain screwed up? I don't know. In fact, I don't know what Commodore stands for these days. As you may have read in "Editor's Notes" in the July issue, the swinging door at Commodore has swung again, this time to let Max Toy out and Harold Copperman in. Where will Commodore go from here? Rumors fly about the 128D's demise and a new super 64.

Nintendo's Success

So here, in my opinion, is why Nintendo has prevailed in the game market:

1. Commodore's lack of marketing strategy.
2. Nintendo's aggressive marketing and advertising initiative.
3. Nintendo's offering the machine as a cartridge-only system.
4. Nintendo's apparent lower price (don't those game cartridges add up, though?).
5. And, as Dennis Joslin said in his letter to Fred D'Ignazio: It's definitely cooler to own a Nintendo than a 64.

Commodore easily could have overcome these problems by

1. Restyling (OK, disguising) the 64 as a game machine.
2. Comparison advertising pitting the 64 against Nintendo.
3. Pricing it head-to-head with Nintendo.
4. Emphasizing the cartridge port—maybe even offering *two* cartridge ports!

Some users aren't even aware that the 64 takes game cartridges. I like cartridges; when they were more prevalent, they were priced about the same as disk-based software. Programs on cartridges load

instantly, they're protected by a sturdy case, and they can't easily be copied—three big advantages over disks.

Commodore, and most 64 software developers, seem to be virtually out of the cartridge business. My original *Programmer's Reference Guide* (now a tattered relic from 1982) optimistically promised cartridge after cartridge, most of which never materialized. (Ever hear of the *Commodore 64 Home Babysitter*?) But disks are so much cheaper to publish; once the code is written, a manufacturer can churn out thousands of clones much more quickly and cheaply than it can make cartridges.

It's ironic. My 64's cartridge port is solidly (and more or less permanently) blocked by one of the few cartridges still on the market—a fast loader—and it's thus dedicated to overcoming one of the 64's greatest liabilities, the slow disk drive. (Another liability is its small memory, but have you ever seen Nintendo's memory so much as mentioned? If it will do the job—whether it's word processing or game playing—who cares?)

Why doesn't Commodore humble itself to promote the 64 as a cartridge-based machine and encourage developers to market more of their software in that format? This would have the added bonus of stifling the ever-raging copy-protection/pirating debate.

With a ninety-nine-dollar 64, Commodore could effectively compete with Nintendo. A stylized box, a slick joystick or two, and a slew of game cartridges—an instant Nintendo clone!

I'm not alarmed by Nintendo's success. I admire its perspicacious marketing. Nintendo's advertising gurus have taken what easily could have been interpreted as a 64 with minimal sound, no possibility of doing productive work, no way of writing your own games, no way of saving your own programs or games in progress, and have propelled it to a huge success—largely at Commodore's expense.

If the only way to keep consumer interest in computers alive is by promoting them as game machines, so be it. Once the kids get the little box home, I don't think it would be long before they'd wonder what else can they could do with the contraption. Commodore, you're blowing a wonderful opportunity to sell even more honest-to-goodness computers.

My brother's two sons are addicted to Nintendo, or at least would be, if their parents were less diligent. If the machine they had bought had been a 64 (as I, of course, dutifully recommended), my brother wouldn't now be shopping for a computer on which his sons could do their homework. But then, Jay and Ben would definitely not have been as cool.

OK, Commodore, rise to the occasion. You have a new president and CEO now; let's see what you can do with what's left of a golden opportunity. I can just see the advertisements screaming at us now: *Buy It for the Games! Use It for the Computer!* **G**

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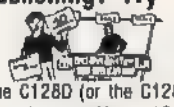

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THE programmer's page

128 Tips

Randy Thompson

"The Programmer's Page" is interested in your programming tips and tricks. Send all submissions to The Programmer's Page, COMPUTE!'s Gazette, *P.O. Box 5406, Greensboro, North Carolina 27403. We'll pay $25–$50 for each tip we publish.*

Readers have sent me a gold mine of 128 programming tips, from hi-res graphics printing to manipulation of the 80-column screen. Take a look; you're bound to find something you can use.

Hi-Res Page Printer

Here's a two-line hi-res screen-dump routine written in 128 BASIC. It takes the 128's hi-res screen, rotates it 90 degrees, and expands it to almost fill an 8½ × 11 inch sheet of paper. This works with Commodore's 1525 and MPS-801 printers only.

```
10 FAST:CLR:B=128:A=B:C=6:H=63
   9:FORJ=0TO6:A(J)=2^J:NEXT:O
   PEN1,4:CMD1:PRINTCHR$(8):DO
   UNTIL H<2:FORJ=0TO6:H(J)=(H
   -J)/2 :NEXT:FORV=0TO199:B=A
20 FORJ=0TOC:LOCATE(J),V:B=B+A
   (J)*RDOT(2):NEXT:B$=CHR$(B)
   :PRINTB$B$;:NEXT:PRINT:H=H-
   7:C=6+4*(H=2):LOOP:PRINTCHR
   $(15):PRINT#1:CLOSE1:END
```

With 256,000 different pixels to process, it takes about 25 minutes for this routine to complete. Note that the first line clears the variables for maximum speed, so be careful when you use it as a subroutine in a program.

Bob Renaud
Washington, MA

Sequential File Reader

Enter the following line to list a sequential file to the screen:

```
OPEN0,8,0,"FILENAME,S,R":SYS41
140
```

These instructions can be entered in immediate mode or used from within a program.

Randy Cole
Claremore, OK

Monitor Printouts

Although there's no command for printing machine language disassemblies from the 128's monitor, there is an easy way to send the monitor's output to the printer. From immediate mode, enter these two commands:

```
OPEN1,4:CMD1
```

and then press F8. This opens a channel to the printer and redirects all output to that channel. When the monitor is invoked by F8, the register information is sent to the printer. Now, when you enter the disassemble instruction (or any other instruction, for that matter), the results are sent to the printer.

When you've finished, use the X command to exit to BASIC and type the following:

```
PRINT#1:CLOSE1
```

All output is now directed to the screen as usual.

Richard R. Harvel
N. Plainfield, NJ

80-Column Tricks

The 128's VDC chip is quite versatile. Here are some tips that illustrate this point.

You can adjust the 80-column screen horizontally or vertically by entering these commands: **SYS 52684,*H*,2:SYS 52684,*V*,7**. Try different numbers in place of *V* and *H*. The default value for *H* is 102 and for *V* is 29.

The 80-column characters can be reduced in size with **SYS 52684,8,9**. To get them back to their normal height, enter **SYS 52684,7,9**.

With this next trick, you can make your 80-column text disappear and reappear in an interesting way. To see how it works, put some text on the screen and run the following program:

```
10 FORI=7TO0STEP-1:SYS52684,I,
   23:FORJ=1TO75:NEXTJ,I
20 SLEEP 1:FORI=0TO7:SYS52684,
   I,23:FORJ=1TO75:NEXTJ,I
```

The next program makes text disappear and reappear in a curtain-like effect. You can use it to close the curtain on old text, change the screen while the curtains are closed, and then reopen the curtain to display the new text.

```
10 FORI=86TO6STEP-1:SYS52684,I
   ,35:FORJ=1TO10:NEXTJ,I
20 REM CHANGE THE SCREEN HERE
   IF YOU WANT TO
30 FORI=6TO86:SYS52684,I,35:FO
   RJ=1TO10:NEXTJ,I
```

For best results, run the program with a full screen of text.

In the March 1989 "Programmer's Page," Tony Phillips showed how you can achieve 40-column text using the 80-column screen. By modifying the Window command, you can make it work even better. Here's the new version:

```
SYS52684,63,0:SYS52684,40,1:SY
S52684,55,2:SYS52690,,25:RREGA
:SYS52684,(A OR 16),25:SYS5268
4,137,22:SYS52684,40,28:WINDOW
0,0,79,11
```

If you want to go back to 80 columns without hitting the RUN-STOP/RESTORE key, use the following commands:

```
SYS52684,120,0:SYS52684,80,1:S
YS52684,102,2:SYS52684,120,22:
SYS52690,,25:RREGA:SYS52684,(A
 AND 239),25:SYS52684,0,27:WIN
DOW0,0,79,24
```

Michael Verdiquel
Lawton, OK

G

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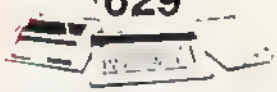

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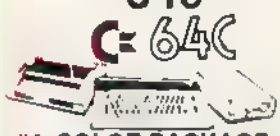

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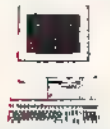

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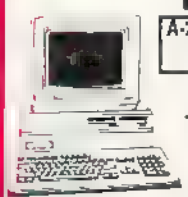

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machine language programming

Powers of 2

Jim Butterfield

Two to the 8th is 256; 2 to the 16th is 65,536. These numbers are useful to know, since they tell you about the inner workings of your computer.

Recently, I heard from someone who wanted to calculate 2 to the 2203rd power. He had hacked out a program in BASIC that would do the job in about seven hours but hoped for something faster.

The result of our conversation is the program "Powers of 2," accompanying this column. If you like looking at huge numbers, you'll like this program. It runs on either the Commodore 128 or the 64 and can calculate very large powers of 2. The highest allowable exponent, 32,767, generates a result that is almost 10,000 digits long. Numbers this size are more a curiosity than useful working values. But some numbers—such as Mersenne primes—do use pretty hefty values.

Raising 2 to a power in binary is simple. To multiply a binary number by 2, you shift it left one bit and add a 0 on the end. Each bit moves left to a position where its value is twice that of the previous one. If you're working with numbers greater than one byte in length (unsigned values over 255), you shift the lowest byte left with ASL (Arithmetic Shift Left) and continue to move the higher bytes along with ROL (ROtate Left). In binary, 2 to the power 2203 is just a one bit followed by 2202 zero bits.

In order to see the result in familiar decimal notation, you must convert it from binary. But that's more work than the calculation itself. For this program, let's use an alternative method which generates decimal digits directly. Starting with value 1, add the number to itself in *decimal mode*. Adding a number to itself is the same as multiplying by 2. This action is repeated the appropriate number of times; the result is the desired number in decimal form.

Sizing

Decimal-mode numbers have their digits packed two to a byte. After the calculation itself is finished, we must unpack each digit of the pair and convert it to ASCII for printing. The whole process seems simple enough. But as the numbers increase in size, there are some special considerations.

If the result is over 512 digits, which happens when the power is greater than 1700, we'll need more than 256 bytes to hold the decimal-mode result. In such a case, we can no longer reach the entire result by means of indexing, using the X or Y registers. Instead, indirect addressing must be used; it's no more complex than indexing, but requires more bookkeeping.

There's another sizing question to consider. Our result might be almost 10,000 digits long, occupying 5000 bytes of memory. Do we need to do all our work with a 5000-byte number, just in case it turns out to be that big? For smaller numbers, that would waste a lot of computing time.

BASIC Program

The BASIC program POKEs the machine language (ML) program into memory at 8192 ($2000) and sets up as much information as it can before the actual calculation. It asks for the power you want to calculate, splits this value into high and low bytes, and puts these into locations 8189 (high) and 8190 (low). It also sets up output redirection, if desired, by means of the CMD statement. After the calculation has been completed, the CMD is canceled with a PRINT #4 statement.

Note that BASIC does all the work that is not speed-sensitive. The calculation itself is done in machine language. After you have run Powers of 2, you may want to disassemble it to examine the code in detail.

Indirect Addressing

The Y register is used as part of the indirect, indexed addressing mode. We set Y to 0 and leave it there.

Our principal indirect address is at $FB and $FC. Each time we perform a decimal-mode addition, we start this address at $2200, which is the low-order end of our result. As the addition proceeds, the indirect address is bumped along until it passes the address stored in $FD and $FE. When it does so, we've covered the whole number. More on the $FD/$FE end-stop later.

The indirect address at $FB/$FC is initialized for each new addition at address $2019 and incremented, using the standard method (INC), at $2029. If you're reading the code, keep in mind that Y always contains 0.

To test whether $FB/$FC has reached the limit marked by $FD/$FE, we compare the two addresses; you see this at $202F. The two-step operation, using CMP (CoMPare) followed by SBC (SuBtraCt) seems odd at first, but it's the usual way of coding address comparisons.

Decrementing two-byte values uses a standard method, too. You see this near the start of the program, where the exponent value is counted down. Near the end, we do the same thing as we print the number: The indirect address at $FD/$FE is backed off until it reaches its original value of $2200.

The Size End-Stop

The calculated value always starts at 1. It will fit into a single byte until it passes 64, at which point two bytes are needed to hold the decimal result. After a while (beyond value 512), three bytes are called for, and so on.

There's no point in doing extra

arithmetic on bytes before they are needed, so the pointer at $FD/$FE is set up to mark the current limit of the number work area. When the calculation starts, the limit is the same as the start of the work area, namely $2200. We move the limit pointer when more space is needed, setting the new memory to 0 before using it. And we detect when more space is needed by looking for an overflow.

For unsigned numbers, overflow is *not* signaled by the V (oVerflow) flag. Instead, the C (Carry) flag does the job. If the addition has generated a carry, and there's no place to put it, it's time to open more memory space. You'll notice that we've used some fancy stack work (PHP, PusH Processor stack, and PLP, PuLl Processor stack) to check for this combination of conditions.

Powers of 2

```
HA 10 DATA 160,0,162,34,132,25
      3,134,254,169,1
HP 20 DATA 145,253,174,254,31,
      208,5,206,253,31,48,53
PX 30 DATA 206,254,31,162,34,1
      32,251,134,252,24,177,25
      1,248
DS 40 DATA 113,251,216,145,251
      ,8,230,251,208,2,230,252
FF 50 DATA 165,253,197,251,165
      ,254,229,252,176,13,40,1
      44,208,8
AM 60 DATA 230,253,208,2,230,2
      54,152,145,253,40,144,21
      5,176,213
BB 70 DATA 177,253,201,16,144,
      13,177,253,74,74,74,74
FP 80 DATA 9,48,32,210,255,177
      ,253,41,15,9,48,32,210,2
      55
QG 90 DATA 166,253,208,2,198,2
      54,202,134,253,224,0
XX 100 DATA 165,254,201,34,176
      ,219,169,13,76,210,255
PB 110 FORJ=8192TO8314:READ X:
      T=T+X:POKEJ,X:NEXTJ:IFT
      <>18933THENSTOP
CC 120 INPUT "2 RAISED TO POWE
      R (0=STOP)";P:IFP 0THEN
      END
QR 130 POKE 8189,P/256:POKE819
      0,PAND255
PR 140 TI$="000000":SYS 8192:P
      RINT:PRINT"TIME "TI/60
      " SECS."
SP 150 GOTO120                    G
```

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d'iversions

Commodore vs. Nintendo: What's Your Opinion?

Fred D'Ignazio

Ever since the great Commodore 64/Nintendo debate began, my mailbox has been stuffed with letters from readers. Some readers have even had opinions about my columns. Here are just a few:

When I read your column "Is There Life After Nintendo?" I felt a little bit insulted. You seemed to give too much advertising to Nintendo. Just out of curiosity, were you paid?
—C. Culianu, Long Island City, NY

I *love* it when there is an article like this one, and, I promise you, *just* because of this article, I'll continue to buy *Gazette* until it's gone.
—Andy Orthmann, LaCenter, WA

Well, readers, do you favor Commodore or Nintendo? Here are some fresh observations from your fellow readers to help you make up your mind.

Cost

The cost of two game cartridges on the Nintendo is equal to the cost of the machine.
—Joel Conover, Green Bay, WI

Games for the Nintendo cost in the $40–$45 range. They are easy to solve, and, after about a week of playing one game, it's time to buy another. Commodore games cost less and last much longer.
—Kevin Bokus, Branford, CT

A 64 with a 1541 disk drive costs about $300 to $350, but if you consider that top-quality games rarely cost over $35, it doesn't take a rocket scientist to figure out that after about half a dozen games you would be better off with the 64.
—Ted Green, Cleveland, OH

Grades

A kid in my class owns a Nintendo and his writing assignments aren't getting done.
—Dan MacKay, Ingersoll, Ontario

For all you Nintendo "stick" jockeys: While you score high on *Donkey Kong, Super Mario Brothers,* and others, your friend may also score just as high on the 64, along with his SAT results, French or Spanish exam, and a college entrance exam.
—Thomas J. Snell, Norwich, CT

With all the emphasis on education and complaints of the competency of today's youth, why do parents buy their children game machines?
—James Taylor, Jacksonville, FL

Memory

If you're using Nintendo cartridges, you can add memory to suit the game, not suit the game to memory.
—Ben Monroe, Benton, AZ

You say you want a complex Nintendo game; I give you *Metroid.* You say you want a Nintendo game with good speech; I give you *Racket Attack.* The reason Nintendo has such good arcade-quality graphics is the amount of memory each cartridge holds—up to one megabyte. That's far more than a 64.
—Mark Hall, Eureka, CA

Writing

I love to express my opinion, but prior to the acquisition of my printer, my opinion was never published. Now, with my 64, an almost-free copy of *SpeedScript* 3.0, and a used printer, I'm becoming famous (or infamous) in the pages of my local newspaper.
—Gerald Palmer, El Paso, TX

Games

My brother and I are just elementary-school-age kids. We are self-taught Commodore programmers and want to make a point. On Nintendo, you can't create games of your own. You have to buy them, and they're not cheap.
—The Baer brothers, Fairfax, VA

A 64 with a 1541 drive cannot handle playing games all day. The 1541 will overheat and stop working properly.
—Ralph L. Pulley, Baltimore, MD

My kids, being of the latchkey variety, are home a minimum of 45 minutes prior to my arrival, and the Nintendo has proven to be a very good occupier of their time during that period. What more could be asked of a game machine?
—Gerald Palmer, El Paso, TX

Where Are the Girls?

The great 64-vs.-Nintendo debate has lasted for several months, yet I've received only two letters from girls. And listen to what one of them has to say:

I'm 13 years old. I know a fair amount about computers, but that's the problem! People have to know so much about computers in order to use one. . . . Our Commodore is rarely used anymore.
—Christine Scholz, Brookfield, WI

Aren't there any other girls out there who have an opinion? And do you all prefer Nintendo?

What About the Future?

It's time to ask the big question. Where are computers going in the future? Maybe the Nintendo is a preview of things to come. Maybe we won't need to use words to control computers; maybe we won't need keyboards. Maybe all programming will be done with joysticks manipulating animated pictures—just like on a Nintendo, except that the pictures will represent ideas, information, facts, programs, and so on. This kind of computer software already has a name—iconic programming.

What do you think? Put your ideas down on paper and send them to

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horizons

Merci, Berkeley

Rhett Anderson

It's difficult to remember just how important GEOS was when it was released. When it first appeared, the 64 was one of the few remaining 8-bit machines facing the onslaught of 16-bitters. GEOS was a bold move—a whole new operating system for the largest installed base of computers in the world. But GEOS was more than an operating system. It was a new way of working with the 64. Application programs like *geoWrite* and *geoPaint* set new standards for 8-bit software.

About a year ago, Berkeley Softworks introduced GEOS for the Apple. According to show-goers at the most recent World of Commodore, the company is now in the midst of leaping into the lucrative MS-DOS market. Older products for the 64 were selling at fire-sale prices, and some planned products have been axed.

I hold no grudge. Berkeley was there when we needed them. The GEOS market on the 64 is largely saturated. Certainly the company can't make much more money there. I'll take my usual liberties and express my appreciation to the company on behalf of the entire Commodore community: Thanks, Berkeley. You helped make the 64 market something special.

Now, upward and onward! What brave new company will be the next to lead the 64 forward?

The Closet Macintosh Syndrome

In the last "Horizons" column, I suggested that perhaps some of the Commodore 64 owners who don't think of their computers as closet computers should write to *MacUser* and express dismay at the statements made in one of its columns.

Joe Gillis of Mt. Savage, Maryland, wrote to say that he'd like *MacUser*'s address and other information about the column. The reason I didn't include that information in "Horizons" is that I didn't want a bunch of people writing to Ms. Kohl (the column's author) unless they had read her column. After all, as I stated last issue, I did take her remark out of context. Please, if you'd like to write, first read the column. You'll find it in the June 1989 *MacUser*. If you can't find that issue and would like to buy one, send $6.00 ($7.00 outside the U.S.) to Ziff Davis Publishing Company, P.O. Box 5999, Cherry Hill, New Jersey 08034; Attention: F. Hunter. If you've read the column and you'd like to say that your 64 is not a closet computer, address your statement to 950 Tower Lane, 18th Floor, Foster City, California 94404.

By the way, Mr. Gillis made some other points—namely, that the Mac is a status symbol and that most people who use computers in their homes can make do just fine with a Commodore 64.

Things Change

My duties here at COMPUTE! have been many and varied. I've been here three years now. I've worked on *COMPUTE!* magazine (both the old *COMPUTE!*, with type-in listings, and the newer version of that ten-year-old flagship magazine). I've also worked on various Amiga projects. But most of the time spent here has been with *Gazette*. It's been a blast. I've learned much about writing, much about editing, and much about the 64. I even had fun becoming a competent 64 programmer—remember *Basketball Sam & Ed* and *Arcade Volleyball?*

I say this to tell you why you'll see my name moving from assistant editor to contributing editor on the masthead. I've taken on other duties here at COMPUTE!. I'll always have a special place in my heart for *Gazette* (there's nothing like your first magazine), but I won't be spending as much time directly working on the magazine. I'll still be there to help *Gazette*'s new crew (actually, there's not much new about the crew; most of them have been here longer than I have) and to contribute in other ways when I have the time. I'll still be writing "Horizons," for instance, except when other members of the staff have a special idea or news they'd like to discuss in this column.

In my opinion, *Gazette* keeps getting better and better. Please welcome Patrick Parrish as associate editor and the technical editors and programmers.

A Bedtime Story

I must digress. All this talk about new beginnings reminds me of a story I'd like to tell.

After I had been here for about six months, I found a letter to "Feedback" in my box. A reader said that he would be canceling his subscription when it became time to renew. The magazine had gone to pot, he said, and he just wasn't interested in it anymore.

I was crestfallen. I had come to *Gazette* and let everybody down. I had ruined a magazine with hundreds of thousands of readers. I couldn't sleep for a week. I lay in bed trying to pinpoint my inadequacies.

I was thoroughly depressed. I read that letter over and over at work. Then one day, I looked at the date. The postmark was a full six months before I even got to COMPUTE!.

I've learned that you can't please everyone. New readers drift in, and old readers drift out (and some stick around forever). But no matter how long you've been with us, we're here for you. We read (and consider) every letter you send us. Keep sending them. **G**

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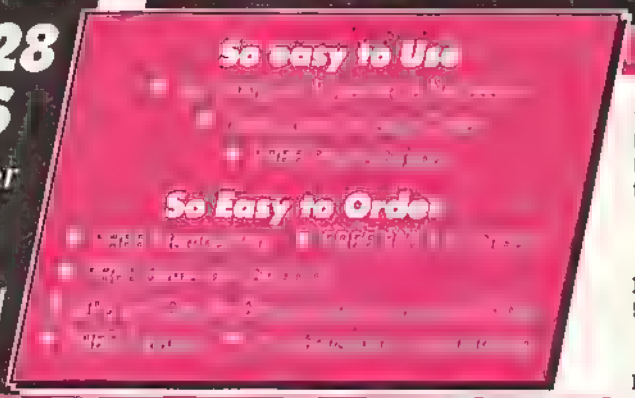

TOP 40 TOP 40 TOP 40

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☐ **U-boat 26** - Fire torpedoes to sink the ships as you avoid enemy mines and depth charges

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☐ **M.A.S.H.** - You are the helicopter pilot responsible for bringing wounded soldiers to the 4077th

☐ **Snow Cat** - You are a rescue ranger who must save ski accident victims

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☐ **Centripod** - Fire at snakes, bugs, and toadstools. A lot like Centipede.

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User Group Update

Edited by Mickey McLean

The following list includes updated entries to our annual "Guide to Commodore User Groups," which last appeared in the May and June 1989 issues.

Send typed additions, corrections, and deletions for this list to

Commodore 64/128 User Group Update
COMPUTE!'s Gazette
P.O. Box 5406
Greensboro, NC 27403

When writing to a user group for information, please remember to enclose a self-addressed envelope with postage that is appropriate for the country to which you're writing.

Note: COMPUTE! Publications does not condone the use of its user group lists by individuals or user groups for the purpose of buying, selling, or trading pirated software. Should we discover any group participating in any such illegal and unethical activity, the club's listing will be permanently deleted from our files.

User Group Notes

The **Western Slope Commodore Users Group** has changed its mailing address to 1325 B Lakeside Drive, Grand Junction, Colorado 81506.

The bulletin board service telephone number for the **CCR Commodore Club** in Rockford, Illinois, listed in the May issue of *Gazette* is no longer in service.

The **McCook Commodore Users Group** of McCook, Nevada, has a new bulletin board service telephone number. The new number is (308) 345-3845.

The **Down East Commodore Users Group** in Havelock, North Carolina, has disbanded and has donated all group-owned materials to an educational institution for the mentally handicapped.

The bulletin board service telephone number for the **Cache Valley Computer Club** in Smithfield, Utah, was listed incorrectly in the June issue of *Gazette*. The correct number is (801) 752-1020.

New Listings

CALIFORNIA

Redding Commodore User Group, P.O. Box 493762, Redding, CA 96049 (BBS# 916-275-5180)

KENTUCKY

Commodore Owners of Owensboro, KY (C.O.O.KY), 3807 Krystal Ln., Owensboro, KY 42303

MISSOURI

MOARK (Missouri/Arkansas) Commodore Users Group, H.C. Rt. 1, Box 85, Lampe, MO 65681

NEW YORK

Triad Artists, Inc., 888 7th Ave., New York, NY 10106

Commodore Long Island Club, Inc., 15 Rochelle Ct., Amityville, NY 11701

Commodore User Group of Orange County, 30 Square Hill Rd., Box 41, New Windsor, NY 12550

NORTH CAROLINA

Avery Computer Enthusiast (ACE), P.O. Box 44, Banner Elk, NC 28604

OHIO

Shelby Computer User Group, P.O. Box 512, Shelby, OH 44875

PENNSYLVANIA

Beaver County Area Commodore Users' Group (B.C.A.C.U.G.), P.O. Box 412, New Brighton, PA 15066

Centre Area Commodore Computer Club, 442 Agricultural Administration Bldg., Penn State University, University Park, PA 16802

WISCONSIN

Lakeshore Commodore Core, 519 Westwood Dr., Sheboygan Falls, WI 53085

Outside the U.S.

AUSTRALIA

Commodore Hornsby User Group, Inc., P.O. Box 1578, Hornsby Northgate, N.S.W. 2077 Australia

MEXICO

Club de Usuarios Commodore de Occidente (CUCO), San Juan de los Lagos #155, Colonia Vallarta Pte., Guadalajara, Jalisco, Mexico **G**

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THE geos column

GEOS SlideShow

John Stabile

Create and display impressive slide presentations with this application for GEOS 64 and GEOS 128, versions 1.3 and higher.

"GEOS SlideShow" allows you to build slide-show presentations using graphics images from *geoPaint*, *geoChart*, or any other GEOS application capable of saving photo scraps. SlideShow also offers features such as fades and borders to enhance your graphics. But the program's best feature by far is that it lets you show off your graphics on a screen by themselves—no more menus or gadgets obscuring your artwork.

Typing It In

Program 1, SlideShow, is written in machine language so you'll need to use "MLX," the machine language entry program found elsewhere in this issue, to type it in. The MLX prompts, and the values you should type in, are as follows:

Starting address: 1503
Ending address: 2662

When you've entered all the data for Program 1, save two copies to disk, one with the filename SLIDESHOW and one with the name SLIDESHOW.BKUP. One copy will be converted by Program 2 into a GEOS application. The other is a backup copy in case you have a problem with the conversion.

Now type in Program 2, "GeoConverter." Be sure to use "The Automatic Proofreader" to prevent typing mistakes when you enter the program. Save a copy of GeoConverter to the disk containing Program 1. Be very careful when typing in GeoConverter. Since it writes directly to your disk, it's possible that a typing error could scramble the disk. Until you're sure that GeoConverter works correctly, use it only on scratch disks.

To prepare GEOS SlideShow, load Program 2 and type RUN. When the program asks you for a filename, enter SLIDESHOW. GeoConverter searches the disk for the file and, when it finds it, converts it into a GEOS application.

Getting Started

You can start GEOS SlideShow in one of two ways: Either open SlideShow itself or open a slide data file. (To open a file, either double-click on its icon or select its icon and then select OPEN from the file menu. See your *GEOS User's Manual* for details.) The method you use to start SlideShow determines whether it opens in create or show mode. To open SlideShow in create mode, double-click on SlideShow's icon. To open it in show mode, double-click on the icon of the slide data file that you want shown.

The first time you run SlideShow, you need to create a slide show. First, either load some of your favorite graphics into *geoPaint* or draw your own. Once you have your graphic onscreen, clip it into a photo scrap using the copy option from the edit menu. (See your *GEOS User's Manual* for more information on photo scraps.)

You don't have to use *geoPaint* to create your photo scraps. You can create them using any program that supports them. *geoChart* or a screen snapshot program is an excellent alternative for creating photo scraps; use your imagination.

Once you have your picture stored in a photo scrap, run the Photo Manager from the GEOS menu and paste your scrap into a photo album. (See your *GEOS User's Manual* for detailed documentation on using the Photo Manager.) Then, go back and create photo scraps for each picture to be added to your slide show and add the scraps to your photo album.

Now, you're ready to run SlideShow. Open it in create mode by double-clicking on its icon. The program first displays a dialog box containing a copyright message, and then it displays a file selector. Use the file selector to choose the photo album that contains the graphics for your slides. After the photo album is loaded, the program takes you to the main screen where it displays the menu bar and the first scrap in the album.

The menu bar contains four menus: geos, file, options, and show. The geos menu allows you to get information about GEOS SlideShow or to use a desk accessory. The items in the file menu operate on the whole slide show. They allow you to change albums, change scraps, save slides, and quit to the deskTop. The items in the options menu allow you to change individual pictures. You can display the slide you're working on, change its border, and change its fade effect. Selecting the show menu displays the slide show.

Putting It Together

To build a slide show, use the previous scrap and next scrap options in the file menu to select the picture for your first slide. Next, select a border for your slide by using the border option under the options menu. SlideShow asks whether you would like a border for the slide. Click on Yes, No, or Cancel. If you select No, the border is turned off for the current slide. If you select Cancel, the previous border remains in effect. If you select Yes, SlideShow lets you set the type of border you want.

The first border setting is the thickness of the top and bottom borders. SlideShow displays a dialog box showing the current line thickness and asks whether you would like to increase the border height. Selecting Yes increases the border thickness by one pixel and redisplays the dialog box. Continually selecting Yes increases the thickness of the border. After the

maximum border thickness has been reached, the border thickness wraps back to 1. Select Yes until the thickness you want is displayed in the dialog box. Selecting OK sets the border thickness. Selecting Cancel reverts to the previous thickness setting.

The next border setting governs the thickness of the side borders. SlideShow displays a dialog box similar to the one for setting the top and bottom border thickness. Use it to set the thickness for the side borders.

The last border setting is the pattern to be used when drawing the borders. Again, SlideShow displays a dialog box for you to choose a pattern. Any of the standard GEOS patterns may be used in rendering the border.

Select the type of fade for your slide using the fade option under the options menu. GEOS SlideShow supports five different fades: the normal top-to-bottom fade, a left-to-right fade, a right-to-left fade, a bottom-to-top fade, and a center-to-edge fade. The program displays a dialog box to allow you to choose the type of fade. Simply click in the box containing the first letter of the type of fade you want.

Finishing Touches

Once you've chosen the options for your slide, you're ready to see how it will look in the slide show. The display option under the options menu does just that. When you select display, SlideShow displays your picture using the fade and border options you selected. The display option is great for fine-tuning your slides. You can display your picture and then go back to the fade and border options to make changes.

When you're satisfied with your slide, use the save slide option in the file menu to store your slide in the slide-show file. After you've saved it, select another scrap, set the border and fade options for it, and save it to the slide-show file. Continue processing slides until you've put all your slides into the slide show.

GEOS SlideShow always stores the slides in the file Slides. Each new slide you add to the file is inserted at the end of the file, so be sure to add slides in the order you want them shown. When you finish creating a slide show, be sure to rename the Slides file to another name. If you don't, SlideShow will add new slides to your file when you try to build a new slide presentation.

Showing Off

Now that your slide show is complete, you're ready to display it. If you've just finished creating it, you can show it by selecting the show menu. GEOS SlideShow displays a file selector containing the slide-show files on the current disk. The slide show you just created is named Slides. To view your slide show, simply click on the name of the file and then click on OPEN.

SlideShow displays the first slide and then waits for the viewer to click the mouse button. It may be easier for others to view your slide presentations if you place a message on your first slide like CLICK THE MOUSE BUTTON TO CONTINUE. SlideShow displays each slide until the user presses the mouse button; then it retrieves the next slide from the disk. When the last slide is shown, clicking the mouse button returns you to the deskTop.

An alternate and more commonly used method for displaying a slide show is to double-click on the slide file's icon. Double-clicking on the data icon causes SlideShow to open in display mode. SlideShow displays a copyright message and waits for the viewer to click on the OK box; then it proceeds to display the slides in the manner mentioned above. After the last slide is shown, SlideShow returns to the deskTop.

See program listings on page 89. **G**

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* Back issues of *COMPUTE!'s PC Magazine* are $16.00 each. This publication is available only as a magazine/disk combination. Our back issue inventory consists mainly of magazines with 5.25 inch disks, but we will attempt to supply 3.5-inch disks if requested. The following issues are **NOT** available: ***PC Magazine*** 9/87, 11/87, 9/88.

* Back issues of *COMPUTE!'s Amiga Resource* magazine are available beginning with Spring 1989 for $6.00 each. Back issues of *COMPUTE!'s Amiga Resource Disk* are available beginning with Summer 1989 for $10.00 each. Disk/magazine combinations are $12.00.

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power BASIC

Shao-Tien Pan

Add dazzling border effects to your BASIC programs with these short machine language routines for the 64.

Looking for ways to enliven the screen on your 64? This month, we present three raster-interrupt routines that create colorful, special effects in the border area. Next month, we'll look at two routines that jazz up the screen display.

The routines for the border are all short; the longest is just over 200 bytes. And, although they're written in machine language, they can easily be customized and included in your BASIC programs.

Getting Started

"On the Border" consists of four short BASIC loaders. The first three programs create the border effects; the fourth turns off each effect. Program 1, "Spectrum," transforms the border into a scrolling rainbow of color. Program 2, "Band," causes several ribbons of color to scroll up and down in the border. Program 3, "Pulse," creates a colorful, accordionlike display. And Program 4, "Off," restores the border to normal.

To avoid typing errors, enter each program using the "The Automatic Proofreader" found elsewhere in this issue. Since the routines have different line numbers, you can type them in separately or combine them into a single program. Before you run any of the programs, be sure to save a copy of each to tape or disk.

To install and activate one of the border effects, load and run Spectrum, Band, or Pulse. To return the border to normal, load and run Off or press RUN/STOP–RESTORE.

The SYS command in the last line of each program, executed from direct mode or from program mode, activates a particular border effect. To turn on Spectrum, enter SYS 49152; for Band, enter SYS 49247; for Pulse, enter SYS 49403; and for Off, enter SYS 49974. To reactivate a border effect after you've disabled it, SYS to it a second time.

Since the routines reside at different addresses, they can all be in memory at once. By including the four loaders in one program, you can switch from one effect to another by executing the appropriate SYS command. For example, you could activate Spectrum with SYS 49152, turn it off with SYS 49974, and then later enable Band with SYS 49247. Also, since these routines are all interrupt-driven, they should work with other programs, provided the IRQ interrupt vector remains intact.

Custom Screens

In three of these programs, Band, Pulse, and Off, you can change the colors that are displayed in the border. First, find the line marked REM COLOR in the program you'd like to modify. Each DATA value in this line represents a standard Commodore color (0–15). To change one of the values, select a color; then substitute the corresponding color value in the line.

For instance, to change the color white to cyan in Band, replace the 1 in line 440 with a 3. Note that if you change the colors in Pulse, you must disable the program before you can run it again. To do this, use Off or press RUN/STOP– RESTORE.

In all four programs, you can switch the special effect from the border to the screen. Simply change the 32 in the lines marked REM SCREEN to a 33; then run the program.

If you modify the programs, be careful. A mistake in the DATA statements could cause the computer to lock up.

See program listings on page 92.

G

ADVERTISERS INDEX

Reader Service Number/Advertiser	Page
102 Access Software Inc.	IBC
103 AvantGarde 64	55
104 BRE Software	67
105 Brwall	56–57
Brown Boxes Inc.	67
106 Capcom	9
107 Central Point Software	61
108 Cheatsheet Products Inc.	67
109 Computer Direct	26–27
110 Creative Micro Designs, Inc.	55
Crown Custom Covers	44
111 Datel Computers	35
112 Fearn & Music	67
113 Gosselin Computer Consultants	67
114 Lyco Computer	40–41
115 Mar-Tin Software Co.	76
116 MicroProse	BC
Montgomery Grant	59
NRI Schools	33
117 P.A.V.Y. Software	70
118 Prof. Jones, Inc.	44
119 Ramco Computer Supplies	70
120 The Soft Group	71
121 Software Discounters of America	46–47
122 Software Excitement!	65
SOGWAP Software	67
Strategic Simulations, Inc.	IFC, 1
123 SubLOGIC	25
124 Superior Micro Systems, Inc.	61
125 Tejas Soft	67
126 Utilities Unlimited, Inc.	63
127 Virgin Mastertronic Intl.	3
128 Weaselgraphics	67
129 The World of Commodore	43

Classified Ads	79
COMPUTE!'s Amiga Subscription	49
COMPUTE!'s Gazette Back Issues	77
COMPUTE!'s Gazette Disk Subscription	17
COMPUTE!'s Gazette 5-Year Index	76
COMPUTE!'s Gazette Games Disk	51
COMPUTE!'s PC Subscription	45
COMPUTE!'s SpeedScript Disk Subscription	71

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MLX Machine Language Entry Program For Commodore 64 and 128

Ottis R. Cowper

"MLX" is a labor-saving utility that allows almost fail-safe entry of machine language programs. Included are versions for the Commodore 64 and 128.

Type in and save some copies of whichever version of MLX is appropriate for your computer (you'll want to use it to enter future ML programs from COMPUTE!'s GAZETTE). Program 1 is for the Commodore 64, and Program 2 is for the 128 (128 MLX can also be used to enter Commodore 64 ML programs for use in 64 mode). When you're ready to enter an ML program, load and run MLX. It asks you for a starting address and an ending address. These addresses appear in the article accompanying the MLX-format program listing you're typing.

If you're unfamiliar with machine language, the addresses (and all other values you enter in MLX) may appear strange. Instead of the usual decimal numbers you're accustomed to, these numbers are in *hexadecimal*—a base 16 numbering system commonly used by ML programmers. Hexadecimal—hex for short—includes the numerals 0–9 and the letters A–F. But don't worry—even if you know nothing about ML or hex, you should have no trouble using MLX.

After you enter the starting and ending addresses, you'll be offered the option of clearing the workspace. Choose this option if you're starting to enter a new listing. If you're continuing a listing that's partially typed from a previous session, don't choose this option.

A functions menu will appear. The first option in the menu is ENTER DATA. If you're just starting to type in a program, pick this. Press the E key, and type the first number in the first line of the program listing. If you've already typed in part of a program, type the line number where you left off typing at the end of the previous session (be sure to load the partially completed program before you resume entry). In any case, make sure the address you enter corresponds to the address of a line in the listing you are entering. Otherwise, you'll be unable to enter the data correctly. If you pressed E by mistake, you can return to the command menu by pressing RETURN alone when asked for the address. (You can get back to the menu from most options by pressing RETURN with no other input.)

Entering A Listing

Once you're in Enter mode, MLX prints the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight data bytes and a checksum. Although an MLX-format listing appears similar to the "hex dump" listings from a machine language monitor program, the extra checksum number on the end allows MLX to check your typing. (Commodore 128 users *can* enter the data from an MLX listing using the built-in monitor if the rightmost column of data is omitted, but we recommend against it. It's much easier to let MLX do the proofreading and error checking for you.)

When you enter a line, MLX recalculates the checksum from the eight bytes and the address and compares this value to the number from the ninth column. If the values match, you'll hear a bell tone, the data will be added to the workspace area, and the prompt for the next line of data will appear. But if MLX detects a typing error, you'll hear a low buzz and see an error message. The line will then be redisplayed for editing.

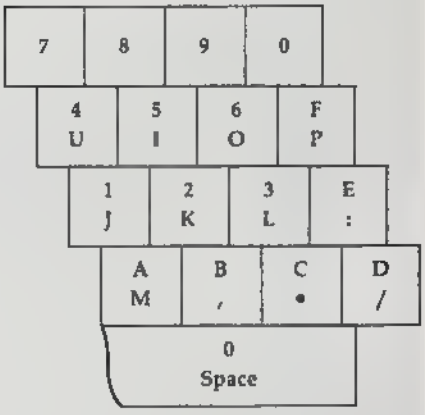
Invalid Characters Banned

Only a few keys are active while you're entering data, so you may have to unlearn some habits. You *do not* type spaces between the columns; MLX automatically inserts these for you. You *do not* press RETURN after typing the last number in a line; MLX automatically enters and checks the line after you type the last digit.

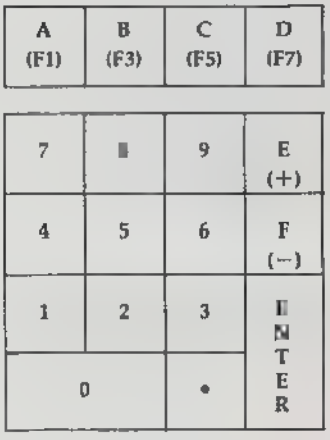
Only the numerals 0–9 and the letters A–F can be typed in. If you press any other key (with some exceptions noted below), you'll hear a warning buzz. To simplify typing, 128 MLX redefines the function keys and + and − keys on the numeric keypad so that you can enter data one-handed. (The 64 version incorporates the keypad modification from the March 1986 "Bug-Swatter" column, lines 485–487.) In either case, the keypad is active only while entering data. Addresses must be entered with the normal letter and number keys. The figures above show the keypad configurations for each version.

MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, MLX will catch your mistake. There is one error that can slip past MLX: Because of the checksum formula used, MLX won't notice if you accidentally type FF in place of 00, and vice versa. And there's a very slim chance that you could garble a line and still end up with a combination of characters that adds up to the proper checksum. However, these mistakes should not occur if you take reasonable care while entering data.

64 MLX Keypad



128 MLX Keypad



Editing Features

To correct typing mistakes before finishing a line, use the INST/DEL key to delete the character to the left of the cursor. (The cursor-left key also deletes.) If you mess up a line really badly, press CLR/HOME to start the line over. The RETURN key is also active, but only before any data is typed on a line. Pressing RETURN at this point returns you to the command menu. After you type a character of data, MLX disables RETURN until the cursor returns to the start of a line. Remember, you can press CLR/HOME to quickly get to a line

number prompt.

More editing features are available when correcting lines in which MLX has detected an error. To make corrections in a line that MLX has redisplayed for editing, compare the line on the screen with the one printed in the listing, then move the cursor to the mistake and type the correct key. The cursor left and right keys provide the normal cursor controls. (The INST/DEL key now works as an alternative cursor-left key.) You cannot move left beyond the first character in the line. If you try to move beyond the rightmost character, you'll reenter the line. During editing, RETURN is active; pressing it tells MLX to recheck the line. You can press the CLR/HOME key to clear the entire line if you want to start from scratch, or if you want to get to a line number prompt to use RETURN to get back to the menu.

Display Data

The second menu choice, DISPLAY DATA, examines memory and shows the contents in the same format as the program listing (including the checksum). When you press D, MLX asks you for a starting address. Be sure that the starting address you give corresponds to a line number in the listing. Otherwise, the checksum display will be meaningless. MLX displays program lines until it reaches the end of the program, at which point the menu is redisplayed. You can pause the display by pressing the space bar. (MLX finishes printing the current line before halting.) Press space again to restart the display. To break out of the display and get back to the menu before the ending address is reached, press RETURN.

Other Menu Options

Two more menu selections let you save programs and load them back into the computer. These are SAVE FILE and LOAD FILE; their operation is quite straightforward. When you press S or L, MLX asks you for the filename. You'll then be asked to press either D or T to select disk or tape.

You'll notice the disk drive starting and stopping several times during a load or save (save only for the 128 version). Don't panic; this is normal behavior. MLX opens and reads from or writes to the file instead of using the usual LOAD and SAVE commands (128 MLX makes use of BLOAD). Disk users should also note that the drive prefix 0: is automatically added to the filename (line 750 in 64 MLX), so this should *not* be included when entering the name. This also precludes the use of @ for Save-with-Replace, so remember to give each version you save a different name. The 128 version makes up for this by giving you the option of scratching the existing file if you want to reuse a filename.

Remember that MLX saves the entire workspace area from the starting address to the ending address, so the save or load may take longer than you might expect if you've entered only a small amount of data from a long listing. When saving a partially completed listing, make sure to note the address where you stopped typing so you'll know where to resume entry when you reload.

MLX reports the standard disk or tape error messages if any problems are detected during the save or load. (Tape users should bear in mind that Commodore computers are never able to detect errors during a save to tape.) MLX also has three special load error messages: INCORRECT STARTING ADDRESS, which means the file you're trying to load does not have the starting address you specified when you ran MLX; LOAD ENDED AT *address*, which means the file you're trying to load ends before the ending address you specified when you started MLX; and TRUNCATED AT ENDING ADDRESS, which means the file you're trying to load extends beyond the ending address you specified when you started MLX. If you see one of these messages and feel certain that you've loaded the right file, exit and rerun MLX, being careful to enter the correct starting and ending addresses.

The 128 version also has a CATALOG DISK option so you can view the contents of the disk directory before saving or loading.

The QUIT menu option has the obvious effect—it stops MLX and enters BASIC. The RUN/STOP key is disabled, so the Q option lets you exit the program without turning off the computer. (Of course, RUN/STOP-RESTORE also gets you out.) You'll be asked for verification; press Y to exit to BASIC, or any other key to return to the menu. After quitting, you can type RUN again and reenter MLX without losing your data, as long as you don't use the clear workspace option.

The Finished Product

When you've finished typing all the data for an ML program and saved your work, you're ready to see the results. The instructions for loading and using the finished product vary from program to program. Some ML programs are designed to be loaded and run like BASIC programs, so all you need to type is LOAD *"filename"*,8 for disk (DLOAD *"filename"* on the 128) or LOAD *"filename"* for tape, and then RUN. Such programs will usually have a starting address of 0801 for the 64 or 1C01 for the 128. Other programs must be reloaded to specific addresses with a command such as LOAD *"filename"*,8,1 for disk (BLOAD *"filename"* on the 128) or LOAD *"filename"*,1,1 for tape, then started with a SYS to a particular memory address. On the Commodore 64, the most common starting address for such programs is 49152, which corresponds to MLX address C000. In either case, you should always refer to the article which accompanies the ML listing for information on loading and running the program.

An Ounce of Prevention

By the time you finish typing in the data for a long ML program, you may have several hours invested in the project. Don't take chances—use our "Automatic Proofreader" to type the new MLX, and then test your copy *thoroughly* before first using it to enter any significant amount of data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses, then use the Display option to verify that the data has been entered correctly. And be sure to test the Save and Load options several times to ensure that you can recall your work from disk or tape. Don't let a simple typing error in the new MLX cost you several nights of hard work.

Program 1: MLX for Commodore 64

```
SS 10 REM VERSION 1.1: LINES 8
      30,950 MODIFIED, LINES 4
      85-487 ADDED
EK 100 POKE 56,50:CLR:DIM IN$,
      I,J,A,B,A$,B$,A(7),N$
DM 110 C4=48:C6=16:C7=7:Z2=2:Z
      4=254:Z5=255:Z6=256:Z7=
      127
CJ 120 FA=PEEK(45)+Z6*PEEK(46)
      :BS=PEEK(55)+Z6*PEEK(56
      ):H$="0123456789ABCDEF"
EB 130 R$=CHR$(13):L$="{LEFT}"
      :S$=" ":D$=CHR$(20):Z$=
      CHR$(0):T$="{13 RIGHT}"
CQ 140 SD=54272:FOR I=SD TO SD
      +23:POKE I,0:NEXT:POKE
      {SPACE}SD+24,15:POKE 78
      8,52
FC 150 PRINT"{CLR}"CHR$(142)CH
      R$(8):POKE 53280,15:POK
      E 53281,15
EJ 160 PRINT T$" {RED}{RVS}
      {2 SPACES}§8 @§
      {2 SPACES}"SPC(28)"
      {2 SPACES}{OFF}{BLU} ML
      X II {RED}{RVS}
      {2 SPACES}"SPC(28)"
      {12 SPACES}{BLU}"
FR 170 PRINT"{3 DOWN}
      {3 SPACES}COMPUTE!'S MA
      CHINE LANGUAGE EDITOR
      {3 DOWN}"
JB 180 PRINT"{BLK}STARTING ADD
```

```
      RESS[4]";:GOSUB300:SA=A
      D:GOSUB1040:IF F THEN18
      0
GF 190 PRINT"{BLK}{2 SPACES}EN
      DING ADDRESS[4]";:GOSUB
      300:EA=AD:GOSUB1030:IF
      {SPACE}F THEN190
KR 200 INPUT"{3 DOWN}{BLK}CLEA
      R WORKSPACE [Y/N][4]";A
      $:IF LEFT$(A$,1)<>"Y"TH
      EN220
PG 210 PRINT"{2 DOWN}{BLU}WORK
      ING...";:FORI=BS TO BS+
      EA-SA+7:POKE I,0:NEXT:P
      RINT"DONE"
DR 220 PRINTTAB(10)"{2 DOWN}
      {BLK}{RVS} MLX COMMAND
      {SPACE}MENU {DOWN}[4]":
      PRINT T$"{RVS}E{OFF}NTE
      R DATA"
BD 230 PRINT T$"{RVS}D{OFF}ISP
      LAY DATA":PRINT T$"
      {RVS}L{OFF}OAD FILE"
JS 240 PRINT T$"{RVS}S{OFF}AVE
       FILE":PRINT T$"{RVS}Q
      {OFF}UIT{2 DOWN}{BLK}"
JH 250 GET A$:IF A$=N$ THEN250
HK 260 A=0:FOR I=1 TO 5:IF A$=
      MID$("EDLSQ",I,1)THEN A
      =I:I=5
FD 270 NEXT:ON A GOTO420,610,6
      90,700,280:GOSUB1060:GO
      TO250
EJ 280 PRINT"{RVS} QUIT ":INPU
      T"{DOWN}[4]ARE YOU SURE
       [Y/N]";A$:IF LEFT$(A$,
      1)<>"Y"THEN220
EM 290 POKE SD+24,0:END
JX 300 IN$=N$:AD=0:INPUTIN$:IF
      LEN(IN$)<>4THENRETURN
KF 310 B$=IN$:GOSUB320:AD=A:B$
      =MID$(IN$,3):GOSUB320:A
      D=AD*256+A:RETURN
PP 320 A=0:FOR J=1 TO 2:A$=MID
      $(B$,J,1):B=ASC(A$)-C4+
      (A$>"@")*C7:A=A*C6+B
JA 330 IF B<0 OR B>15 THEN AD=
      0:A=-1:J=2
GX 340 NEXT:RETURN
CH 350 B=INT(A/C6):PRINT MID$(
      H$,B+1,1);:B=A-B*C6:PRI
      NT MID$(H$,B+1,1);:RETU
      RN
RR 360 A=INT(AD/Z6):GOSUB350:A
      =AD-A*Z6:GOSUB350:PRINT
      ":";
BE 370 CK=INT(AD/Z6):CK=AD-Z4*
      CK+Z5*(CK>Z7):GOTO390
PX 380 CK=CK*Z2+Z5*(CK>Z7)+A
JC 390 CK=CK+Z5*(CK>Z5):RETURN
QS 400 PRINT"{DOWN}STARTING AT
      [4]";:GOSUB300:IF IN$<>
      N$ THEN GOSUB1030:IF F
      {SPACE}THEN400
EX 410 RETURN
HD 420 PRINT"{RVS} ENTER DATA
      {SPACE}":GOSUB400:IF IN
      $=N$ THEN220
JK 430 OPEN3,3:PRINT
SK 440 POKE198,0:GOSUB360:IF F
       THEN PRINT IN$:PRINT"
      {UP}{5 RIGHT}";
GC 450 FOR I=0 TO 24 STEP 3:B$
      =S$:FOR J=1 TO 2:IF F T
      HEN B$=MID$(IN$,I+J,1)
HA 460 PRINT"{RVS}"B$L$;:IF I<
      24THEN PRINT"{OFF}";
HD 470 GET A$:IF A$=N$ THEN470
FK 480 IF(A$>"/"ANDA$<":")OR(A
      $>"@"ANDA$<"G")THEN540
GS 485 A=-(A$="M")-2*(A$=",")-
      3*(A$=".")-4*(A$="/")-5
      *(A$="J")-6*(A$="K")
FX 486 A=A-7*(A$="L")-8*(A$=":
      ")-9*(A$="U")-10*(A$="I
      ")-11*(A$="O")-12*(A$="
      P")
CM 487 A=A-13*(A$=S$):IF A THE
      N A$=MID$("ABCD123E456F
      0",A,1):GOTO 540
MP 490 IF A$=R$ AND((I=0)AND(J
      =1)OR F)THEN PRINT B$;:
      J=2:NEXT:I=24:GOTO550
KC 500 IF A$="{HOME}" THEN PRI
      NT B$:J=2:NEXT:I 24:NEX
      T:F=0:GOTO440
MX 510 IF(A$="{RIGHT}")ANDF TH
      ENPRINT B$L$;:GOTO540
GK 520 IF A$<>L$ AND A$<>D$ OR
      ((I=0)AND(J=1))THEN GOS
      UB1060:GOTO470
HG 530 A$=L$+S$+L$:PRINT B$L$;
      :J=2-J:IF J THEN PRINT
      {SPACE}L$;:I=I-3
QS 540 PRINT A$;:NEXT J:PRINT
      {SPACE}S$;
PM 550 NEXT I:PRINT:PRINT"{UP}
      {5 RIGHT}";:INPUT#3,IN$
      :IF IN$=N$ THEN CLOSE3:
      GOTO220
QC 560 FOR I=1 TO 25 STEP3:B$=
      MID$(IN$,I):GOSUB320:IF
       I<25 THEN GOSUB380:A(I
      /3)=A
PK 570 NEXT:IF A<>CK THEN GOSU
      B1060:PRINT"{BLK}{RVS}
      {SPACE}ERROR: REENTER L
      INE [4]":F=1:GOTO440
HJ 580 GOSUB1080:B=BS+AD-SA:FO
      R I=0 TO 7:POKE B+I,A(I
      ):NEXT
QQ 590 AD=AD+8:IF AD>EA THEN C
      LOSE3:PRINT"{DOWN}{BLU}
      ** END OF ENTRY **{BLK}
      {2 DOWN}":GOTO700
GQ 600 F=0:GOTO440
QA 610 PRINT"{CLR}{DOWN}{RVS}
      {SPACE}DISPLAY DATA ":G
      OSUB400:IF IN$=N$ THEN2
      20
RJ 620 PRINT"{DOWN}{BLU}PRESS:
       {RVS}SPACE{OFF} TO PAU
      SE, {RVS}RETURN{OFF} TO
       BREAK[4]{DOWN}"
KS 630 GOSUB360:B=BS+AD-SA:FOR
      I=BTO B+7:A=PEEK(I):GOS
      UB350:GOSUB380:PRINT S$
      ;
CC 640 NEXT:PRINT"{RVS}";:A=CK
      :GOSUB350:PRINT
KH 650 F=1:AD=AD+8:IF AD>EA TH
      ENPRINT"{DOWN}{BLU}** E
      ND OF DATA ***:GOTO220
KC 660 GET A$:IF A$=R$ THEN GO
      SUB1080:GOTO220
EQ 670 IF A$=S$ THEN F=F+1:GOS
      UB[illegible]
AD 680 ONFGOTO630,660,630
CM 690 PRINT"{DOWN}{RVS} LOAD
      {SPACE}DATA ":OP=1:GOTO
      710
PC 700 PRINT"{DOWN}{RVS} SAVE
      {SPACE}FILE ":OP=0
RX 710 IN$=N$:INPUT"{DOWN}FILE
      NAME[4]";IN$:IF IN$=N$
      {SPACE}THEN220
PR 720 F=0:PRINT"{DOWN}{BLK}
      {RVS}T{OFF}APE OR {RVS}
      D{OFF}ISK: [4]";
FP 730 GET A$:IP A$="T"THEN PR
      INT"T{DOWN}":GOTO880
HQ 740 IF A$<>"D"THEN730
HH 750 PRINT"D{DOWN}":OPEN15,8
      ,15,"I0:":B=EA-SA:IN$="
      0:"+IN$:IF OP THEN810
SQ 760 OPEN 1,8,8,IN$+",P,W":G
      OSUB860:IF A THEN220
FJ 770 AH=INT(SA/256):AL=SA-(A
      H*256):PRINT#1,CHR$(AL)
      ;CHR$(AH);
PE 780 FOR I=0 TO B:PRINT#1,CH
      R$(PEEK(BS+I));:IF ST T
      HEN800
FC 790 NEXT:CLOSE1:CLOSE15:GOT
      O940
GS 800 GOSUB1060:PRINT"{DOWN}
      {BLK}ERROR DURING SAVE:
      [4]":GOSUB860:GOTO220
MA 810 OPEN 1,8,8,IN$+",P,R":G
      OSUB860:IF A THEN220
GE 820 GET#1,A$,B$:AD=ASC(A$+Z
      $)+256*ASC(B$+Z$):IF AD
      <>SA THEN F=1:GOTO850
RX 830 FOR I=0 TO B:GET#1,A$:P
      OKE BS+I,ASC(A$+Z$):IF(
      I<>B)AND ST THEN F=2:AD
      =I:I=B
FA 840 NEXT:IF ST<>64 THEN F=3
FQ 850 CLOSE1:CLOSE15:ON ABS(F
      >0)+1 GOTO960,970
SA 860 INPUT#15,A,A$:IF A THEN
       CLOSE1:CLOSE15:GOSUB10
      60:PRINT"{RVS}ERROR: "A
      $
GQ 870 RETURN
EJ 880 POKE183,PEEK(FA+2):POKE
      187,PEEK(FA+3):POKE188,
      PEEK(FA+4):IFOP=0THEN92
      0
HJ 890 SYS 63466:IF(PEEK(783)A
      ND1)THEN GOSUB1060:PRIN
      T"{DOWN}{RVS} FILE NOT
      {SPACE}FOUND ":GOTO690
CS 900 AD=PEEK(829)+256*PEEK(8
      30):IF AD<>SA THEN F=1:
      GOTO970
SC 910 A=PEEK(831)+256*PEEK(83
      2)-1:F=F-2*(A<EA)-3*(A>
      EA):AD=A-AD:GOTO930
KM 920 A=SA:B=EA+1:GOSUB1010:P
      OKE780,3:SYS 63338
JF 930 A=BS:B=BS+(EA-SA)+1:GOS
      UB1010:ON OP GOTO950:SY
      S 63591
AE 940 GOSUB1080:PRINT"{BLU}**
       SAVE COMPLETED **":GOT
      O220
XP 950 POKE147,0:SYS 63562:IF
      {SPACE}ST>0 THEN970
FR 960 GOSUB1080:PRINT"{BLU}**
       LOAD COMPLETED **":GOT
      O220
DP 970 GOSUB1060:PRINT"{BLK}
      {RVS}ERROR DURING LOAD:
      {DOWN}[4]":ON F GOSUB98
      0,990,1000:GOTO220
PP 980 PRINT"INCORRECT STARTIN
      G ADDRESS (";:GOSUB360:
      PRINT")":RETURN
GR 990 PRINT"LOAD ENDED AT ";:
      AD=SA+AD:GOSUB360:PRINT
       D$:RETURN
FD 1000 PRINT"TRUNCATED AT END
      ING ADDRESS":RETURN
RX 1010 AH=INT(A/256):AL=A-(AH
      *256):POKE193,AL:POKE1
      94,AH
FF 1020 AH=INT(B/256):AL=B-(AH
      *256):POKE174,AL:POKE1
      75,AH:RETURN
FX 1030 IF AD<SA OR AD>EA THEN
       1050
HA 1040 IF(AD>511 AND AD<40960
```

```
        )OR(AD>49151 AND AD<53
        248)THEN GOSUB1080:F=0
        :RETURN
HC 1050 GOSUB1060:PRINT"{RVS}
        {SPACE}INVALID ADDRESS
         {DOWN}{BLK}":F=1:RETU
        RN
AR 1060 POKE SD+5,31:POKE SD+6
        ,208:POKE SD,240:POKE
        {SPACE}SD+1,4:POKE SD+
        4,33
DX 1070 FOR S=1 TO 100:NEXT:GO
        TO1090
PF 1080 POKE SD+5,8:POKE SD+6,
        240:POKE SD,0:POKE SD+
        1,90:POKE SD+4,17
AC 1090 FOR S=1 TO 100:NEXT:PO
        KE SD+4,0:POKE SD,0:PO
        KE SD+1,0:RETURN
```

Program 2: MLX for Commodore 128

```
AE 100 TRAP 960:POKE 4627,128:
       DIM NL$,A(7)
XP 110 Z2=2:Z4=254:Z5=255:Z6=2
       56:Z7=127:BS=256*PEEK(4
       627):EA=65280
FB 120 BE$=CHR$(7):RT$=CHR$(13
       ):DL$=CHR$(20):SP$=CHR$
       (32):LF$=CHR$(157)
KE 130 DEF FNHB(A)=INT(A/256):
       DEF FNLB(A)=A-FNHB(A)*2
       56:DEF FNAD(A)=PEEK(A)+
       256*PEEK(A+1)
JB 140 KEY 1,"A":KEY 3,"B":KEY
        5,"C":KEY 7,"D":VOL 15
       :IF RGR(0)=5 THEN FAST
FJ 150 PRINT"{CLR}"CHR$(142);C
       HR$(8):COLOR 0,15:COLOR
        4,15:COLOR 6,15
GQ 160 PRINT TAB(12)"{RED}
       {RVS}{2 SPACES}{9 @}
       {2 SPACES}"RT$;TAB(12)"
       {RVS}{2 SPACES}{OFF}
       {BLU} 128 MLX {RED}
       {RVS}{2 SPACES}"RT$;TAB
       (12)"{RVS}{13 SPACES}
       {BLU}"
FE 170 PRINT"{2 DOWN}
       {3 SPACES}COMPUTE!'S MA
       CHINE LANGUAGE EDITOR
       {2 DOWN}"
DK 180 PRINT"{BLK}STARTING ADD
       RESS{4}";:GOSUB 260:IF
       {SPACE}AD THEN SA=AD:EL
       SE 180
FH 190 PRINT"{BLK}{2 SPACES}EN
       DING ADDRESS{4}";:GOSUB
        260:IF AD THEN EA=AD:E
       LSE 190
■■ 200 PRINT"{DOWN}{BLK}CLEAR
       {SPACE}WORKSPACE [Y/N]?
       {4}":GETKEY A$:IF A$<>"
       Y" THEN 220
QH 210 PRINT"{DOWN}{BLU}WORKIN
       G...";:BANK 0:FOR A=BS
       {SPACE}TO BS+(EA-SA)+7:
       POKE A,0:NEXT A:PRINT"D
       ONE"
DC 220 PRINT TAB(10)"{DOWN}
       {BLK}{RVS} MLX COMMAND
       {SPACE}MENU {4}{DOWN}":
       PRINT TAB(13)"{RVS}E
       {OFF}NTER DATA"RT$;TAB(
       13)"{RVS}D{OFF}ISPLAY D
       ATA"RT$;TAB(13)"{RVS}L
       {OFF}OAD FILE"
HB 230 PRINT TAB(13)"{RVS}S
       {OFF}AVE FILE"RT$;TAB(1
       3)"{RVS}C{OFF}ATALOG DI
       SK"RT$;TAB(13)"{RVS}Q
       {OFF}UIT{DOWN}{BLK}"
AP 240 GETKEY A$:A=INSTR("EDLS
       CQ",A$):ON A GOTO 340,5
       50,640,650,930,940:GOSU
       B 950:GOTO 240
SX 250 PRINT"STARTING AT";:GOS
       UB 260:IF(AD<>0)OR(A$=N
       L$)THEN RETURN:ELSE 250
BG 260 A$=NL$:INPUT A$:IF LEN(
       A$)=4 THEN AD DEC(A$)
PP 270 IF AD=0 THEN BEGIN:IF A
       $<>NL$ THEN 300:ELSE RE
       TURN:BEND
MA 280 IF AD<SA OR AD>EA THEN
       {SPACE}300
PM 290 IF AD>511 AND AD<65280
       {SPACE}THEN PRINT BE$;:
       RETURN
SQ 300 GOSUB 950:PRINT"{RVS} I
       NVALID ADDRESS {DOWN}
       {BLK}":AD=0:RETURN
RD 310 CK=FNHB(AD):CK=AD-Z4*CK
       +Z5*(CK>Z7):GOTO 330
DD 320 CK=CK*Z2+Z5*(CK>Z7)+A
AH 330 CK=CK+Z5*(CK>Z5):RETURN
QD 340 PRINT BE$;"{RVS} ENTER
       {SPACE}DATA ":GOSUB 250
       :IF A$=NL$ THEN 220
JA 350 BANK 0:PRINT:F=0:OPEN 3
       ,3
BR 360 GOSUB 310:PRINT HEX$(AD
       )+":";:IF F THEN PRINT
       {SPACE}L$:PRINT"{UP}
       {5 RIGHT}";
QA 370 FOR I=0 TO 24 STEP 3:B$
       =SP$:FOR J=1 TO 2:IF F
       {SPACE}THEN B$=MID$(L$,
       I+J,1)
PS 380 PRINT"{RVS}"B$+LF$;:IF
       {SPACE}I<24 THEN PRINT"
       {OFF}";
RC 390 GETKEY A$:IF (A$>"/" AN
       D A$<":") OR(A$>"@" AND
        A$<"G") THEN 470
AC 400 IF A$="+" THEN A$="E":G
       OTO 470
QB 410 IF A$="-" THEN A$="F":G
       OTO 470
FB 420 IF A$=RT$ AND ((I=0) AN
       D (J=1) OR F) THEN PRIN
       T B$;:J=2:NEXT:I=24:GOT
       O 480
RD 430 IF A$="{HOME}" THEN PRI
       NT B$:J=2:NEXT:I=24:NEX
       T:F=0:GOTO 360
XB 440 IF (A$="{RIGHT}") AND F
        THEN PRINT B$+LF$;:GOT
       O 470
JP 450 IF A$<>LF$ AND A$<>DL$
       {SPACE}OR ((I=0) AND (J
       =1)) THEN GOSUB 950:GOT
       O 390
PS 460 A$=LF$+SP$+LF$:PRINT B$
       +LF$;:J=2-J:IF J THEN P
       RINT LF$;:I=I-3
GB 470 PRINT A$;:NEXT J:PRINT
       {SPACE}SP$;
HA 480 NEXT I:PRINT:PRINT"{UP}
       {5 RIGHT}";:L$="
       {27 SPACES}"
DP 490 FOR I=1 TO 25 STEP 3:GE
       T#3,A$,B$:IF A$=SP$ THE
       N I=25:NEXT:CLOSE 3:GOT
       O 220
BA 500 A$=A$+B$:A=DEC(A$):MID$
       (L$,I,2)=A$:IF I<25 THE
       N GOSUB 320:A(I/3)=A:GE
       T#3,A$
AH 510 NEXT I:IF A<>CK THEN GO
       SUB 950:PRINT:PRINT"
       {RVS} ERROR: REENTER LI
       NE ":F=1:GOTO 360
DX 520 PRINT BE$:B=BS+AD-SA:FO
       R I=0 TO 7:POKE B+I,A(I
       ):NEXT I
XB 530 F=0:AD=AD+8:IF AD<=EA T
       HEN 360
CA 540 CLOSE 3:PRINT"{DOWN}
       {BLU}** END OF ENTRY **
       {BLK}{2 DOWN}":GOTO 650
MC 550 PRINT BE$;"{CLR}{DOWN}
       {RVS} DISPLAY DATA ":GO
       SUB 250:IF A$=NL$ THEN
       {SPACE}220
JF 560 BANK 0:PRINT"{DOWN}
       {BLU}PRESS: {RVS}SPACE
       {OFF} TO PAUSE, {RVS}RE
       TURN{OFF} TO BREAK{4}
       {DOWN}"
XA 570 PRINT HEX$(AD)+":";:GOS
       UB 310:B=BS+AD-SA
DJ 580 FOR I=B TO B+7:A=PEEK(I
       ):PRINT RIGHT$(HEX$(A),
       2);SP$;:GOSUB 320:NEXT
       {SPACE}I
XB ■■ PRINT"{RVS}";RIGHT$(HEX
       $(CK),2)
GR 600 F=1:AD=AD+8:IF AD>EA TH
       EN PRINT"{BLU}** END OF
        DATA **":GOTO 220
■■ 610 GET A$:IF A$=RT$ THEN P
       RINT BE$:GOTO 220
QK 620 IF A$=SP$ THEN F=F+1:PR
       INT BE$;
XS 630 ON F GOTO 570,610,570
RF 640 PRINT BE$"{DOWN}{RVS} L
       OAD DATA ":OP=1:GOTO 66
       ■
BP 650 PRINT BE$"{DOWN}{RVS} S
       AVE FILE ":OP=0
DM 660 F=0:F$=NL$:INPUT"FILENA
       ME{4}";F$:IF F$=NL$ THE
       N 220
PF 665 IF LEN(F$)>14 THEN 660
RF 670 PRINT"{DOWN}{BLK}{RVS}T
       {OFF}APE OR {RVS}D{OFF}
       ISK: {4}";
SQ 680 GETKEY A$:IF A$="T" THE
       N 850:ELSE IF A$<>"D" T
       HEN 680
SP 690 PRINT"DISK{DOWN}":IF OP
        THEN 760
■■ 700 DOPEN#1,(F$+",P"),W:IF
       {SPACE}DS THEN A$=D$:GO
       TO 740
JH 710 BANK 0:POKE BS-2,FNLB(S
       A):POKE BS-1,FNHB(SA):P
       RINT"SAVING ";F$:PRINT
MC 720 FOR A=BS-2 TO BS+EA-SA:
       PRINT#1,CHR$(PEEK(A));:
       IF ST THEN A$="DISK WRI
       TE ERROR":GOTO 750
GC 730 NEXT A:CLOSE 1:PRINT"
       {BLU}** SAVE COMPLETED
       {SPACE}WITHOUT ERRORS *
       *":GOTO 220
RA 740 IF DS=63 THEN BEGIN:CLO
       SE 1:INPUT"{BLK}REPLACE
        EXISTING FILE [Y/N]{4}
       ";A$:IF A$="Y" THEN SCR
       ATCH(F$):PRINT:GOTO 700
       :ELSE PRINT"{BLK}":GOTO
        660:BEND
GA 750 CLOSE 1:GOSUB 950:PRINT
       "{BLK}{RVS} ERROR DURIN
       G SAVE: {4}":PRINT A$:G
       OTO 220
FD 760 DOPEN#1,(F$+",P"):IF DS
        THEN A$=DS$:F=4:CLOSE
       {SPACE}1:GOTO 790
```

```
PX 770 GET#1,A$,B$:CLOSE 1:AD=
       ASC(A$)+256*ASC(B$):IF
       {SPACE}AD<>SA THEN F=1:
       GOTO 790
KB 780 PRINT"LOADING ";F$:PRIN
       T:BLOAD(F$),B0,P(BS):AD
       =SA+FNAD(174)-BS-1:F=-2
       *(AD<EA)-3*(AD>EA)
RQ 790 IF F THEN 800:ELSE PRIN
       T"{BLU}** LOAD COMPLETE
       D WITHOUT ERRORS **":GO
       TO 220
ER 800 GOSUB 950:PRINT"{BLK}
       {RVS} ERROR DURING LOAD
       : {4}":ON F GOSUB 810,8
       20,830,840:GOTO220
QJ 810 PRINT"INCORRECT STARTIN
       G ADDRESS (";HEX$(AD);"
       )":RETURN
DP 820 PRINT"LOAD ENDED AT ";H
       EX$(AD):RETURN
EB 830 PRINT"TRUNCATED AT ENDI
       NG ADDRESS ("HEX$(EA)")
       ":RETURN
FP 840 PRINT"DISK ERROR ";A$:R
       ETURN
KS 850 PRINT"TAPE":AD=POINTER(
       F$):BANK 1:A=PEEK(AD):A
       L=PEEK(AD+1):AH=PEEK(AD
       +2)
XX 860 BANK 15:SYS DEC("FF68")
       ,0,1:SYS DEC("FFBA"),1,
       1,0:SYS DEC("FFBD"),A,A
       L,AH:SYS DEC("FF90"),12
       8:IF OP THEN 890
PG 870 PRINT:A=SA:B=EA+1:GOSUB
        920:SYS DEC("E919"),3:
       PRINT"SAVING ";F$
AB 880 A=BS:B=BS+(EA-SA)+1:GOS
       UB 920:SYS DEC("EA18"):
       PRINT"{DOWN}{BLU}** TAP
       E SAVE COMPLETED **":GO
       TO 220
CP 890 SYS DEC("E99A"):PRINT:I
       F PEEK(2816)=5 THEN GOS
       UB 950:PRINT"{DOWN}
       {BLK}{RVS} FILE NOT FOU
       ND ":GOTO 220
GQ 900 PRINT"LOADING ...{DOWN}
       ":AD=FNAD(2817):IF AD<>
       SA THEN F=1:GOTO 800:EL
       SE AD=FNAD(2819)-1:F=-2
       *(AD<EA)-3*(AD>EA)
JD 910 A=BS:B=BS+(EA-SA)+1:GOS
       UB 920:SYS DEC("E9FB"):
       IF ST>0 THEN 800:ELSE 7
       90
XB 920 POKE193,FNLB(A):POKE194
       ,FNHB(A):POKE 174,FNLB(
       B):POKE 175,FNHB(B):RET
       URN
CP 930 CATALOG:PRINT"{DOWN}
       {BLU}** PRESS ANY KEY F
       OR MENU **":GETKEY A$:G
       OTO 220
MM 940 PRINT BE$"{RVS} QUIT
       {4}";RTS;"ARE YOU SURE
       {SPACE}{Y/N}?":GETKEY A
       $:IF A$<>"Y" THEN 220:E
       LSE PRINT"{CLR}":BANK 1
       5:END
JE 950 SOUND 1,500,10:RETURN
AF 960 IF ER=14 AND EL=260 THE
       N RESUME 300
MK 970 IF ER=14 AND EL=500 THE
       N RESUME NEXT
KJ 980 IF ER=4 AND EL=780 THEN
        F=4:A$=DS$:RESUME 800
DQ 990 IF ER=30 THEN RESUME:EL
       SE PRINT ERR$(ER);" ERR
       OR IN LINE";EL
```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July—Speakers, Stereo, and MIDI Solutions; Mine Sweeper, Monster Bar-B-Q (128), Math Magic, CHR$ Graphics, Financial Planner, 1581 Directory Sorter, GEOS File Retriever

FOR ORDER INFORMATION AND FORM, SEE PAGE 69.
Corresponding monthly disks are available only for issues from January 1986 forward.

The Automatic Proofreader

Philip I. Nelson

"The Automatic Proofreader" helps you type in program listings for the 128, 64, Plus/4, and 16 and prevents nearly every kind of typing mistake.

Type in the Proofreader *exactly* as listed. Since the program can't check itself, type carefully to avoid mistakes. Don't omit any lines, even if they contain unfamiliar commands. After finishing, save a copy or two on disk or tape before running it. This is important because the Proofreader erases the BASIC portion of itself when you run it, leaving only the machine language portion in memory.

Next, type RUN and press RETURN. After announcing which computer it's running on, the Proofreader displays the message "Proofreader Active". Now you're ready to type in a BASIC program.

Every time you finish typing a line and press RETURN, the Proofreader displays a two-letter checksum in the upper-left corner of the screen. Compare this result with the two-letter checksum printed to the left of the line in the program listing. If the letters match, it's almost certain the line was typed correctly. If the letters don't match, check for your mistake and correct the line.

The Proofreader ignores spaces not enclosed in quotes, so you can omit or add spaces between keywords and still see a matching checksum. However, since spaces inside quotes are almost always significant, the Proofreader pays attention to them. For example, **10 PRINT"THIS IS BASIC"** will generate a different checksum than **10 PRINT"THIS ISBA SIC"**.

A common typing error is transposition—typing two successive characters in the wrong order, like PIRNT instead of PRINT or 64378 instead of 64738. The Proofreader is sensitive to the *position* of each character within the line and thus catches transposition errors.

The Proofreader does *not* accept keyword abbreviations (for example, ? instead of PRINT). If you prefer to use abbreviations, you can still check the line by LISTing it after typing it in, moving the cursor back to the line, and pressing RETURN. LISTing the line substitutes the full keyword for the abbreviation and allows the Proofreader to work properly. The same technique works for rechecking programs you've already typed in.

If you're using the Proofreader on the Commodore 128, Plus/4, or 16, *do not perform any GRAPHIC commands while the Proofreader is active.* When you perform a command like GRAPHIC 1, the computer moves everything at the start of BASIC program space—including the Proofreader—to another memory area, causing the Proofreader to crash. The same thing happens if you *run* any program with a GRAPHIC command while the Proofreader is in memory.

Though the Proofreader doesn't interfere with other BASIC operations, it's a good idea to disable it before running another program. However, the Proofreader is purposely difficult to dislodge: It's not affected by tape or disk operations, or by pressing RUN/STOP– RESTORE. The simplest way to disable it is to turn the computer off then on. A gentler method is to SYS to the computer's built-in reset routine (SYS 65341 for the 128, 64738 for the 64, and 65526 for the Plus/4 and 16). These reset routines erase any program in memory, so be sure to save the program you're typing in before entering the SYS command.

If you own a Commodore 64, you may already have wondered whether the Proofreader works with other programming utilities like "MetaBASIC." The answer is generally yes, *if you're using a 64 and activate the Proofreader after installing the other utility.* For example, first load and activate MetaBASIC, then load and run the Proofreader.

When using the Proofreader with another utility, you should disable *both* programs before running a BASIC program. While the Proofreader seems unaffected by most utilities, there's no way to promise that it will work with any and every combination of utilities you might want to use. The more utilities activated, the more fragile the system becomes.

The New Automatic Proofreader

```
10 VEC=PEEK(772)+256*PEEK(773)
   :LO=43:HI=44
20 PRINT "AUTOMATIC PROOFREADE
   R FOR ";:IF VEC=42364 THEN
   {SPACE}PRINT "C-64"
30 IF VEC=50556 THEN PRINT "V1
   C-20"
40 IF VEC=35158 THEN GRAPHIC C
   LR:PRINT "PLUS/4 & 16"
50 IF VEC=17165 THEN LO=45:HI=
   46:GRAPHIC CLR:PRINT"128"
60 SA=(PEEK(LO)+256*PEEK(HI))+
   6:ADR=SA
70 FOR J=0 TO 166:READ BYT:POK
   E ADR,BYT:ADR=ADR+1:CHK=CHK
   +BYT:NEXT
80 IF CHK<>20570 THEN PRINT "*
   ERROR* CHECK TYPING IN DATA
    STATEMENTS":END
90 FOR J=1 TO 5:READ RF,LF,HF:
   RS=SA+RF:HB=INT(RS/256):LB=
   RS-(256*HB)
100 CHK=CHK+RF+LF+HF:POKE SA+L
   F,LB:POKE SA+HF,HB:NEXT
110 IF CHK<>22054 THEN PRINT "
   *ERROR* RELOAD PROGRAM AND
   {SPACE}CHECK FINAL LINE":EN
   D
120 POKE SA+149,PEEK(772):POKE
    SA+150,PEEK(773)
130 IF VEC=17165 THEN POKE SA+
   14,22:POKE SA+18,23:POKESA+
   29,224:POKESA+139,224
140 PRINT CHR$(147);CHR$(17);"
   PROOFREADER ACTIVE":SYS SA
150 POKE HI,PEEK(HI)+1:POKE (P
   EEK(LO)+256*PEEK(HI))-1,0:N
   EW
160 DATA 120,169,73,141,4,3,16
   9,3,141,5,3
170 DATA 88,96,165,20,133,167,
   165,21,133,168,169
180 DATA 0,141,0,255,162,31,18
   1,199,157,227,3
190 DATA 202,16,248,169,19,32,
   210,255,169,18,32
200 DATA 210,255,160,0,132,180
   ,132,176,136,230,180
210 DATA 200,185,0,2,240,46,20
   1,34,208,8,72
220 DATA 165,176,73,255,133,17
   6,104,72,201,32,208
230 DATA 7,165,176,208,3,104,2
   08,226,104,166,180
240 DATA 24,165,167,121,0,2,13
   3,167,165,168,105
250 DATA 0,133,168,202,208,239
   ,240,202,165,167,69
260 DATA 168,72,41,15,168,185,
   211,3,32,210,255
270 DATA 104,74,74,74,74,168,1
   85,211,3,32,210
280 DATA 255,162,31,189,227,3,
   149,199,202,16,248
290 DATA 169,146,32,210,255,76
   ,86,137,65,66,67
300 DATA 68,69,70,71,72,74,75,
   77,80,81,82,83,88
310 DATA 13,2,7,167,31,32,151,
   116,117,151,128,129,167,136
   ,137
```

G

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BEFORE TYPING . . .

Before typing in programs, please refer to "How to Type In COMPUTE!'s Gazette Programs," elsewhere in this issue.

Wham Ball

See instructions in article on page 22 before typing in.

```
0801:14 08 0A 00 9E 20 32 30 68
0809:38 34 20 43 4F 4D 50 55 20
0811:54 45 21 20 50 55 42 4C 6B
0819:49 43 41 54 49 4F 4E 53 83
0821:00 00 00 20 67 09 20 B4 87
0829:09 A9 01 85 35 4C 34 08 EB
0831:20 B4 09 A5 08 C9 02 90 F5
0839:05 C6 08 20 3E 0B 20 6D 4C
0841:0F 20 E4 FF D0 FB 20 E4 19
0849:FF C9 0D D0 0A A9 00 85 F6
0851:35 20 FA 09 4C C3 08 C9 3F
0859:8C D0 10 AD 18 16 C9 02 6F
0861:90 DF CE 18 16 CE 18 16 3F
0869:4C 70 08 C9 88 D0 06 20 0D
0871:D4 09 4C 47 08 C9 85 D0 5F
0879:06 A9 01 85 12 D0 08 C9 1D
0881:89 D0 0A A9 00 85 12 20 C0
0889:FE 0A 4C 42 08 C9 86 D0 8E
0891:0E A5 08 C9 02 90 05 C6 D2
0899:08 20 3E 0B 4C 47 08 C9 B7
08A1:8A D0 0E A5 08 C9 20 B0 9F
08A9:05 E6 08 20 3E 0B 4C 47 F6
08B1:08 20 CF 0E 20 81 0F A9 77
08B9:01 85 0E A9 5A 85 0F 4C 5B
08C1:47 08 20 6D 0F 20 CA 13 F3
08C9:A9 00 85 0E 20 CF 0E 20 BC
08D1:81 0F 20 EF 0E 20 F9 0E 5C
08D9:20 2A 11 20 34 10 20 AF 7A
08E1:10 20 27 13 20 85 0B A5 EA
08E9:13 D0 33 A5 0C C9 05 B0 BA
08F1:02 E6 0C A5 32 D0 FC A0 08
08F9:00 20 7E 13 A9 05 85 32 B1
0901:85 34 A9 20 99 78 04 A9 7A
0909:01 85 15 20 85 0B A5 32 77
0911:D0 F5 C8 C4 0A D0 E2 A9 71
0919:00 85 34 4C 31 08 AD 0D E9
0921:D0 C9 FA 90 A7 20 7E 13 44
0929:A9 03 85 32 A9 14 85 31 7E
0931:A5 32 D0 FC A5 12 D0 04 A7
0939:C6 0C F0 0D A5 32 D0 FC 35
0941:20 61 0D 20 B6 0E 4C C3 A9
0949:08 A9 20 8D 00 04 20 07 FD
0951:0A 20 B6 0E 78 A9 31 8D 82
0959:14 03 A9 EA 8D 15 03 58 39
0961:20 66 13 4C 24 08 20 66 2C
0969:13 A9 93 20 D2 FF A9 0E 5C
0971:20 D2 FF A9 08 20 D2 FF 49
0979:A9 00 8D 20 D0 8D 21 D0 E3
0981:8D 18 16 AA BD 44 16 95 8E
0989:06 A9 00 95 0E 95 16 95 EA
0991:1E 95 31 E8 E0 08 D0 EC 82
0999:85 10 20 EC 13 20 3A 0A DC
09A1:20 0E 14 20 C8 09 20 32 A8
09A9:13 20 FE 0A 20 3E 0B 20 FD
09B1:73 0B 60 20 B0 0D A2 00 4D
09B9:86 35 20 A0 0B 20 FB 0D 48
09C1:20 88 0E 20 61 0D 60 A0 6A
09C9:00 B9 19 16 29 3F 99 0F 57
09D1:04 A9 03 99 0F D8 C8 C0 78
09D9:09 D0 EE 60 A5 35 F0 25 91
09E1:A0 00 B9 0B 08 29 3F 99 29
09E9:80 04 A9 01 99 80 D8 C8 CB
09F1:C0 16 D0 EE 60 A5 35 F0 E7
09F9:0C A0 00 A9 20 99 00 04 41
0A01:C8 C0 16 D0 F8 60 A0 00 04
0A09:B9 32 16 29 3F 99 67 06 11
0A11:A9 07 99 67 DA C8 C0 09 E9
0A19:D0 EE 60 A5 34 F0 19 A0 EF
0A21:00 B9 3B 16 29 3F 99 91 77
0A29:06 B9 91 DA 49 01 29 01 30
0A31:99 91 DA C8 C0 05 D0 E9 04
0A39:60 A9 7F 8D 0D DC A5 01 D8
0A41:29 FB 85 01 A9 00 85 FB FD
0A49:85 FD A9 D0 85 FC A9 30 85
0A51:85 FE A2 08 A0 00 B1 FB 21
0A59:91 FD 88 D0 F9 E6 FC E6 20
0A61:FE CA D0 F0 A5 01 09 04 18
0A69:85 01 A9 81 8D 0D DC A0 C8
0A71:00 B9 AE 0A 99 00 32 C8 84
0A79:C0 40 D0 F5 A0 00 B9 EE DE
0A81:0A 99 F8 33 B9 F6 0A 99 AA
0A89:F8 37 C8 C0 40 D0 EF AD DF
0A91:16 D0 09 10 8D 16 D0 A9 17
0A99:1C 8D 18 D0 A9 01 8D 22 BD
0AA1:D0 AD 18 16 29 03 A8 A5 3A
0AA9:00 8D 23 D0 60 3C 28 28 02
0AB1:3C 7D 3C 3C 41 3C 00 28 B1
0AB9:7C 3C 3D 54 01 3C 28 28 79
0AC1:3D 3C 7C 15 40 3C 00 28 7F
0AC9:7C 3C 3D 54 01 E9 E9 6B 07
0AD1:6B E9 E9 6B 6B 6B E9 E9 D0
0AD9:6B 6B E9 E9 6B 6B 6B E9 24
0AE1:E9 6B 6B E9 E9 E9 6B 6B 0B
0AE9:E9 E9 6B 6B E9 00 00 55 36
0AF1:AA FF 00 00 00 00 00 FF 5B
0AF9:00 55 AA 00 00 A0 00 B9 F4
0B01:22 16 29 3F 99 47 04 A9 62
0B09:03 99 47 D8 C8 C0 05 D0 A1
0B11:EE A0 00 A5 12 D0 13 B9 D4
0B19:27 16 29 3F 99 4D 04 A9 15
0B21:01 99 4D D8 C8 C0 03 D0 75
0B29:EE 60 B9 2A 16 29 3F 99 16
0B31:4D 04 A9 01 99 4D D8 C8 B0
0B39:C0 03 D0 EE 60 A0 00 B9 B8
0B41:2D 16 29 3F 99 50 04 A9 4C
0B49:03 99 50 D8 C8 C0 05 D0 03
0B51:EE 38 A9 21 E5 08 AA A0 79
0B59:00 A9 6F 99 56 04 A9 02 79
0B61:99 56 D8 C8 CA D0 F2 A9 AA
0B69:20 99 56 04 C8 C0 22 D0 5F
0B71:F6 60 A0 09 A9 30 99 1E 1F
0B79:04 A9 01 99 1E D8 88 D0 EB
0B81:F3 84 15 60 A5 15 F0 16 D4
0B89:C6 15 A2 08 BD 1E 04 C9 55
0B91:39 D0 08 A9 30 9D 1E 04 4C
0B99:CA D0 F1 FE 1E 04 60 A0 D9
0BA1:00 A5 06 99 78 D8 99 78 4E
0BA9:D9 99 78 DA 99 E8 DA A9 9F
0BB1:20 99 78 04 99 78 05 99 DF
0BB9:78 06 99 E8 06 C8 D0 E1 26
0BC1:A9 27 A2 04 A0 A0 20 AB 7E
0BC9:0C A9 11 A2 04 A0 F0 20 41
0BD1:01 0D A9 11 A2 05 A0 15 71
0BD9:20 01 0D A9 02 A2 07 A0 C5
0BE1:7C 20 AB 0C A9 03 A2 07 1A
0BE9:A0 88 20 AB 0C A9 48 8D 46
0BF1:F1 04 8D 16 05 A5 07 8D 6F
0BF9:F1 D8 8D 16 D9 A9 EC 8D 2F
0C01:F2 04 A9 FB 8D 15 05 A9 FC
0C09:FC 8D 72 07 A9 FE 8D 95 BB
0C11:07 A9 E1 8D F0 04 A9 61 78
0C19:8D 17 05 20 78 14 AD 18 E7
0C21:16 C9 14 90 0D 48 20 98 A4
0C29:0C 68 09 08 C9 1A D0 02 5D
0C31:A9 1F 85 14 66 14 B0 0B C7
0C39:A9 11 A2 05 A0 23 20 AB 8C
0C41:0C D0 18 A9 15 A2 05 A0 0F
0C49:71 20 AB 0C 66 14 90 21 1E
0C51:A9 13 A2 05 A0 EA 20 AB 44
0C59:0C D0 16 66 14 90 12 A9 85
0C61:05 A2 05 A0 EA 20 AB 0C 8A
0C69:A9 05 A2 05 A0 F8 20 AB 11
0C71:0C 66 14 90 09 A9 0A A2 5A
0C79:05 A0 1E 20 01 0D 66 14 1F
0C81:90 09 A9 0A A2 05 A0 37 9B
0C89:20 01 0D 66 14 90 03 A9 96
0C91:03 A2 06 A0 93 D0 0F A9 46
0C99:01 A2 06 A0 DC 20 01 0D 1C
0CA1:A9 01 A2 06 A0 9A 20 01 34
0CA9:0D 60 20 50 0D A9 6C 91 E2
0CB1:FB C8 A9 62 91 FB C8 C4 28
0CB9:18 D0 F7 A9 7B 91 FB A9 6F
0CC1:28 20 0F 13 A9 28 20 1B 52
0CC9:13 A0 00 A9 E1 91 FB C8 44
0CD1:A9 40 91 FB A5 07 91 FD 2B
0CD9:C8 C4 18 D0 F3 A9 61 91 32
0CE1:FB A9 28 20 0F 13 A9 28 A9
0CE9:20 1B 13 A0 00 A9 7C 91 76
0CF1:FB C8 A9 E2 91 FB C8 C4 70
0CF9:18 D0 F7 A9 7E 91 FB 60 7E
0D01:20 50 0D A6 18 A9 6C 91 1D
0D09:FB C8 A9 62 91 FB C8 A9 66
0D11:7B 91 FB A9 28 20 0F 13 5A
0D19:A9 28 20 1B 13 A0 00 A9 8C
0D21:E1 91 FB C8 A9 40 91 FB 0A
0D29:A5 07 91 FD C8 A9 61 91 2B
0D31:FB A9 28 20 0F 13 A9 28 FA
0D39:20 1B 13 CA D0 DF A0 00 80
0D41:A9 7C 91 FB C8 A9 E2 91 85
0D49:FB C8 A9 7E 91 FB 60 85 73
0D51:18 84 FB 84 FD 86 FC 18 7C
0D59:8A 69 D4 85 FE A0 00 60 E0
0D61:A9 DE 8D 0D D0 A9 34 8D AD
0D69:0C D0 A9 60 8D 10 D0 A9 F0
0D71:FF 8D 15 D0 20 78 14 A0 4A
0D79:00 A9 20 99 00 04 C8 C0 FD
0D81:0A D0 F8 A6 0C A0 00 A9 EA
0D89:51 99 00 04 A9 01 99 00 77
0D91:D8 C8 CA D0 F1 A9 00 B1
0D99:85 19 A9 01 85 1A A9 01 EA
0DA1:85 1D 85 1B A9 03 85 1E AA
0DA9:85 1C A0 0F 84 09 60 20 BB
0DB1:78 14 A5 12 D0 00 EE 18 5F
0DB9:16 AD 18 16 C9 1B 90 02 8C
0DC1:A9 01 8D 18 16 29 03 A8 70
0DC9:B9 40 16 8D 23 D0 85 00 D9
0DD1:A9 08 85 07 A5 0A C9 28 F4
0DD9:F0 02 E6 0A A5 0A 85 13 DD
0DE1:A0 00 B9 12 16 29 3F 99 12
0DE9:28 04 A9 03 99 28 D8 C8 66
0DF1:C0 07 D0 EE A9 01 8D 2E D1
0DF9:D8 60 A9 00 85 11 A9 FF 91
0E01:8D 0E D4 8D 0F D4 A9 81 7B
0E09:8D 12 D4 A6 0A AD 1B D4 87
0E11:29 1F 69 04 85 21 AD 1B 1E
0E19:D4 29 0F 69 05 A8 20 4D BA
0E21:13 A4 21 B1 04 C9 20 D0 87
0E29:E4 A9 49 91 04 A5 04 85 A8
0E31:FD 18 A5 05 69 D4 85 FE FF
0E39:E6 06 A5 06 09 08 91 FD E8
0E41:C6 06 CA D0 C8 A9 00 8D 23
0E49:0E D4 8D 0F D4 8D 12 D4 1A
0E51:A9 08 85 02 A9 32 85 03 39
0E59:E6 11 A5 11 29 03 AA F0 8E
0E61:10 18 A5 02 69 08 85 02 D8
0E69:A5 03 69 00 85 03 CA D0 E4
0E71:F0 A0 00 B1 02 99 48 32 B2
0E79:C8 C0 08 D0 F6 60 A5 0F CB
0E81:D0 03 85 0E 60 C6 0F A9 3E
0E89:28 85 02 A9 32 85 03 E6 8A
0E91:10 A5 10 29 03 AA F0 10 68
0E99:18 A5 02 69 08 85 02 A5 02
0EA1:03 69 00 85 03 CA D0 F0 C7
0EA9:A0 00 B1 02 99 00 32 C8 66
0EB1:C0 08 D0 F6 60 20 E4 FF 07
0EB9:D0 FB 20 E4 FF C9 0D F0 C1
0EC1:0C 20 6D 0F 20 CF 0E 20 07
0EC9:81 0F 4C BB 0E 60 A5 C5 B2
0ED1:C9 02 D0 07 A9 01 85 16 50
0ED9:4C E0 0E A9 00 85 16 AD A0
0EE1:8D 02 29 02 F0 05 A9 01 7A
0EE9:85 17 60 85 17 60 AD 8D 16
0EF1:02 29 01 F0 02 D0 F7 60 2C
0EF9:A5 38 D0 56 20 E1 FF D0 CF
0F01:1E A5 36 F0 1F A5 37 CD 39
0F09:4E 16 B0 20 AD 15 D0 29 78
0F11:ED 8D 15 D0 AD 4D 16 85 8D
0F19:38 A9 1B 8D 11 D0 60 A5 2C
0F21:36 D0 09 60 A2 01 86 36 12
0F29:A2 08 86 37 20 47 11 20 3F
0F31:47 11 C6 37 A4 37 AD 11 F1
0F39:D0 10 F6 29 F8 19 4B 0F A7
0F41:8D 11 D0 C0 00 D0 02 84 5C
0F49:36 60 03 03 02 01 00 00 3F
0F51:01 02 C6 39 D0 07 C6 38 45
0F59:D0 03 4C 6D 0F AD 20 D0 41
0F61:45 06 8D 20 D0 A5 39 29 10
0F69:38 85 30 60 A9 00 8D 20 99
0F71:D0 85 38 85 36 A9 FF 8D 9E
0F79:15 D0 A9 1B 8D 11 D0 60 EF
```

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0F81:A5 38 D0 57 C6 0B D0 53 67
0F89:AD 4C 16 85 0B A5 17 F0 BA
0F91:13 AD F8 07 C9 F9 F0 1C 68
0F99:EE F8 07 EE F9 07 EE FA 02
0FA1:07 4C B5 0F AD F8 07 C9 27
0FA9:F5 F0 09 CE F8 07 CE F9 88
0FB1:07 CE FA 07 A5 16 F0 13 51
0FB9:AD FB 07 C9 FE F0 1C EE 0E
0FC1:FB 07 EE FC 07 EE FD 07 44
0FC9:4C DC 0F AD FB 07 C9 FA 8C
0FD1:F0 09 CE FB 07 CE FC 07 B8
0FD9:CE FD 07 60 A9 00 85 20 3E
0FE1:38 AD 0D D0 E9 30 4A 66 41
0FE9:20 4A 66 20 4A 66 20 A8 4E
0FF1:A5 20 C9 81 90 01 C8 84 DA
0FF9:1F A9 00 85 22 85 23 AD 85
1001:10 D0 29 40 F0 04 A9 01 72
1009:85 22 38 AD 0C D0 E9 10 DD
1011:85 21 A5 22 E9 00 85 22 8F
1019:46 22 66 21 66 23 46 22 32
1021:66 21 66 23 46 22 66 21 64
1029:66 23 A5 23 C9 81 90 02 A3
1031:E6 21 60 20 DD 0F A4 1F AE
1039:88 20 4D 13 A4 21 B1 04 91
1041:C9 40 D0 09 A9 00 85 1A 73
1049:8D 00 D4 F0 47 A4 1F C8 AD
1051:20 4D 13 A4 21 B1 04 C9 23
1059:40 D0 0B A9 01 85 1A A9 C5
1061:80 8D 00 D4 D0 2E A4 1F 1A
1069:20 4D 13 A4 21 88 B1 04 2C
1071:C9 40 D0 0B A9 01 85 19 C6
1079:A9 80 8D 00 D4 D0 15 A4 F8
1081:1F 20 4D 13 A4 21 C8 B1 01
1089:04 C9 40 D0 20 A9 00 85 60
1091:19 8D 00 D4 A5 25 49 01 44
1099:85 25 8D 01 D4 85 30 A9 4E
10A1:00 85 27 E6 15 A9 01 85 4D
10A9:0E A9 05 85 0F 60 20 DD 4C
10B1:0F A4 1F 20 4D 13 A4 21 89
10B9:B1 04 C9 49 D0 3A A9 20 64
10C1:91 04 18 A5 05 69 D4 85 06
10C9:05 A5 06 91 04 C6 13 18 29
10D1:A5 15 69 14 85 15 38 A5 0F
10D9:0A E5 13 AA A0 00 A9 49 27
10E1:99 78 04 A9 0F 99 78 D8 B0
10E9:C8 CA D0 F2 A9 1E 85 0F 4A
10F1:A9 01 85 0E 20 7E 13 60 3A
10F9:C9 7F D0 22 A5 24 F0 0B C5
1101:20 78 14 A9 0A 85 31 A9 E0
1109:04 D0 0C 20 9F 14 20 7E F0
1111:13 A9 28 85 31 A9 02 85 3E
1119:32 A9 05 85 33 60 C9 FF 66
1121:D0 06 A5 24 F0 E5 D0 F6 DB
1129:60 C6 1E D0 11 A5 1C 85 DA
1131:1E A5 1A F0 06 CE 0D D0 74
1139:4C 3F 11 EE 0D D0 C6 1D B8
1141:D0 29 A5 1B 85 1D A5 19 81
1149:D0 11 38 AD 0C D0 E9 01 72
1151:8D 0C D0 B0 16 A9 20 8D 87
1159:10 D0 60 18 AD 0C D0 69 ED
1161:01 8D 0C D0 90 05 A9 60 42
1169:8D 10 D0 60 AD 19 D0 8D 77
1171:19 D0 10 03 4C 2A 12 AD 63
1179:8D DC 58 A5 32 C9 05 D0 92
1181:03 20 9B 13 C6 0D D0 10 ED
1189:A9 0A 85 0D 20 51 0E 20 07
1191:1C 0A 20 DD 09 4C A2 11 F5
1199:A5 0D C9 05 D0 56 20 F6 72
11A1:09 A5 32 F0 23 C9 01 D0 1A
11A9:06 20 9B 13 4C C9 11 C9 F0
11B1:02 D0 06 20 B0 13 4C C9 FF
11B9:11 C9 03 20 C0 13 4C C9 ED
11C1:11 C9 04 D0 03 20 B4 13 81
11C9:A5 24 F0 15 AD 77 07 8D 1E
11D1:90 07 49 80 8D 77 07 AD 35
11D9:25 D0 49 02 8D 25 D0 D0 7F
11E1:13 AD 6B 06 49 80 8D 6B 99
11E9:06 EE 6B DA AD 6B DA 49 FF
11F1:09 8D 6B DA A5 0E F0 03 61
11F9:20 7F 0E A5 26 F0 27 A5 11
1201:27 D0 12 E6 30 A5 30 C9 DF
1209:4B B0 0A 8D 08 D4 A9 00 FF
1211:85 27 4C 31 EA C6 30 A5 D6
1219:30 C9 04 90 E6 A5 30 8D 0D
1221:08 D4 A9 01 85 27 4C 31 56
1229:EA AD 1E D0 C9 C0 D0 24 16
1231:A5 24 F0 1D A9 01 85 1A 97
1239:AD 0C D0 C9 AF 90 06 A9 63
1241:01 85 19 D0 0C C9 A0 B0 F0
1249:06 A9 00 85 19 D0 02 45 88
1251:19 4C BC FE AE 4C 16 86 F5
1259:0B 29 7F C9 45 B0 4F A9 0F
1261:01 85 19 85 1A AD F8 07 63
1269:C9 F5 D0 16 A5 17 F0 09 DF
1271:A9 01 85 1B A2 03 4C FE C5
1279:12 A9 01 85 1B A2 06 4C 45
1281:02 13 C9 F6 D0 08 A9 02 10
1289:85 1B A2 03 D0 77 C9 F7 AB
1291:D0 08 A9 03 85 1B A2 02 65
1299:D0 6B C9 F8 D0 08 A9 03 C6
12A1:85 1B A2 01 D0 57 A9 06 F0
12A9:85 1B A2 01 D0 53 A9 01 E3
12B1:85 1A A9 00 85 19 AD F8 3C
12B9:07 C9 FA D0 14 A5 16 F0 94
12C1:08 A9 01 85 1B A2 03 D0 07
12C9:34 A9 01 85 1B A2 06 D0 2B
12D1:30 C9 FB D0 08 A9 02 85 7D
12D9:1B A2 03 D0 28 C9 FC D0 D4
12E1:08 A9 03 85 1B A2 02 D0 65
12E9:1C C9 FD D0 08 A9 03 85 CD
12F1:1B A2 01 D0 08 A9 06 85 F1
12F9:1B A2 01 D0 04 A0 0F D0 13
1301:06 A0 0A D0 02 A0 01 84 B9
1309:09 86 1C 4C BC FE 18 65 15
1311:FB 85 FB A5 FC 69 00 85 83
1319:FC 60 18 65 FD 85 FD A5 D6
1321:FE 69 00 85 FE 60 A6 08 48
1329:A4 09 88 D0 FD CA D0 F8 B7
1331:60 78 A9 6D 8D 14 03 A9 1E
1339:11 8D 15 03 AD 1E D0 AD 53
1341:19 D0 8D 19 D0 A9 84 8D 2F
1349:1A D0 58 60 A9 00 85 04 1E
1351:A9 04 85 05 18 A5 04 69 17
1359:28 85 04 A5 05 69 00 85 23
1361:05 88 D0 F0 60 A0 00 98 73
1369:99 00 D4 C8 C0 19 D0 F8 8B
1371:60 A0 00 98 99 0E D4 C8 F0
1379:C0 07 D0 F8 60 A9 08 8D B2
1381:13 D4 A9 FF 8D 14 D4 A9 AB
1389:04 8D 11 D4 A9 45 8D 12 14
1391:D4 A9 01 85 32 A9 04 85 CA
1399:31 60 06 31 A5 31 8D 0F 60
13A1:D4 C9 80 90 09 A9 00 85 32
13A9:32 A9 00 8D 0F D4 60 E6 9F
13B1:31 D0 02 C6 31 A5 31 8D 61
13B9:0F D4 C6 33 F0 E7 60 A5 36
13C1:31 8D 0F D4 C6 31 F0 DD CD
13C9:60 A2 FF A9 0F 8D 18 D4 17
13D1:8D 13 D4 A9 FF 8D 14 D4 EB
13D9:A9 81 8D 12 D4 8E 0F D4 DB
13E1:A0 00 88 D0 FD CA D0 F5 29
13E9:4C 72 13 20 66 13 A9 08 12
13F1:8D 0C D4 A9 FF 8D 0D D4 3C
13F9:A9 17 8D 0B D4 A9 0F 8D 16
1401:18 D4 A9 01 85 26 A9 05 CC
1409:85 25 4C 95 10 A0 00 98 BB
1411:99 00 3D 99 00 3E 99 00 73
1419:3F 88 D0 F4 A9 CC 85 FB F3
1421:A9 14 85 FC A9 06 85 FD 12
1429:A9 3D 85 FE A2 0C A0 00 9C
1431:B1 FB C9 0D F0 05 91 FD F7
1439:C8 D0 F5 C8 98 20 0F 13 BB
1441:A9 40 20 1B 13 CA D0 E6 50
1449:A0 00 B9 F2 15 99 00 D0 08
1451:C8 C0 10 D0 F5 A0 00 B9 09
1459:0A 16 99 27 D0 B9 02 16 39
1461:99 F8 07 C8 C0 08 D0 EF B9
1469:A9 20 8D 10 D0 A9 3F 8D 5A
1471:1D D0 A9 FF 8D 15 D0 A9 9D
1479:00 8D 25 D0 8D 26 D0 85 E2
1481:24 A9 0B 8D 2E D0 A9 80 E8
1489:8D 1C D0 A9 7F 8D 6B 06 43
1491:A9 0F 8D 6B DA A9 20 8D 06
1499:77 07 8D 90 07 60 AD 0D 1C
14A1:D0 C9 AF B0 25 C9 3C 90 FE
14A9:21 A9 02 8D 25 D0 A9 07 AC
14B1:8D 26 D0 85 24 A9 20 8D 32
14B9:6B 06 A9 7F 8D 77 07 8D 2C
14C1:90 07 A9 0F 8D 77 DB 8D A9
14C9:90 DB 60 02 AA 00 0A 56 1D
14D1:80 29 FD A0 A7 FF 68 95 F1
14D9:55 58 91 10 18 91 11 18 37
14E1:91 10 18 91 11 58 90 11 0F
14E9:58 95 55 58 A7 FF 68 29 0B
14F1:FD A0 0A 56 80 02 AA 0D 56
14F9:1C 00 00 27 00 00 27 C0 B1
1501:00 1F F0 00 0F FC 00 03 80
1509:FF 00 00 FF 80 00 3F C0 76
1511:00 0F C0 00 03 80 0D 1C 67
1519:00 00 27 80 00 27 E0 00 8E
1521:1F F8 00 07 FE 00 01 FF 83
1529:80 00 7F C0 00 1F C0 00 8D
1531:07 80 0D 1F 80 00 27 F0 D5
1539:00 27 FC 00 1F FF 00 03 C8
1541:FF C0 00 7F E0 00 0F E0 99
1549:00 01 C0 0D 1F 80 00 27 BE
1551:FE 00 27 FF C0 1F FF E0 43
1559:03 FF E0 00 1F C0 0D 1F 56
1561:FF E0 27 FF F0 27 FF F0 BD
1569:1F FF E0 0D 00 00 38 00 80
1571:00 C4 00 03 C4 00 0F F8 3A
1579:00 3F F0 00 FF C0 01 FF 96
1581:00 03 FC 00 03 F0 00 01 E8
1589:C0 0D 00 00 38 00 01 E4 FF
1591:00 07 E4 00 1F F8 00 7F 76
1599:E0 01 FF 80 03 FE 00 03 93
15A1:F8 00 01 E0 0D 00 01 F8 D9
15A9:00 0F E4 00 3F E4 00 FF C1
15B1:F8 03 FF C0 07 FE 00 07 60
15B9:F0 00 03 80 0D 00 01 F8 28
15C1:00 7F E4 03 FF E4 07 FF 3A
15C9:F8 07 FF C0 03 F8 0D 07 5B
15D1:FF F8 0F FF E4 0F FF E4 64
15D9:07 FF F8 0D 00 00 00 00 77
15E1:3E 00 00 7F 00 00 7F 00 22
15E9:00 7F 00 00 7F 00 00 3E 2E
15F1:0D 26 E5 7E E5 EA E5 56 CD
15F9:E5 BA E5 1B E5 34 DE A9 9B
1601:E8 F5 F5 F5 FA FA FA FF F6
1609:F4 0F 0F 0F 0F 0F 0F 0C 25
1611:0B 4C 45 56 45 4C 20 00 7F
1619:57 48 41 4D 20 42 41 4C D8
1621:4C 54 52 41 49 4E 4E 4F 56
1629:20 59 45 53 53 50 45 45 45
1631:44 47 41 4D 45 20 4F 56 ED
1639:45 52 42 4F 4E 55 53 06 4E
1641:02 04 05 02 08 17 0A 0F EF
1649:08 05 0A 05 0D 02 00 00 BC
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MR Scribble

See instructions in article on page 50 before typing in.

```
C000:A9 00 8D 20 D0 8D 21 D0 D9
C008:20 90 FF A2 00 A9 00 9D 2C
C010:00 80 9D 00 81 9D 00 82 6A
C018:9D 00 83 9D 00 D8 9D 00 51
C020:D9 9D 00 DA 9D 00 DB 9D E5
C028:00 20 A9 20 9D 00 04 9D 7B
C030:00 05 9D 00 06 9D 00 07 54
C038:E8 D0 D2 A9 F0 8D 00 20 35
C040:8D 03 20 8D 06 20 8D 09 FA
C048:20 A9 01 8D 15 D0 A9 80 FC
C050:8D F8 07 A9 06 8D 3E 03 38
C058:8D 3F 03 8D 40 03 A9 00 0B
C060:8D 3C 03 8D 3D 03 8D 1B 1D
C068:D0 8D 17 D0 8D 1C D0 8D B1
C070:1D D0 A9 02 8D 41 03 20 A1
C078:DF C3 20 E8 C2 CE 40 03 42
C080:AD 40 03 D0 F5 A9 80 8D 3B
C088:40 03 20 E4 FF C9 42 D0 B9
C090:03 EE 20 D0 C9 C2 D0 03 5E
C098:EE 21 D0 C9 31 90 0B C9 3C
C0A0:3A B0 07 AA 29 0F 8D 3F D6
C0A8:03 8A C9 88 B0 03 20 0F F1
C0B0:C3 C9 8C D0 03 20 54 C3 2A
C0B8:C9 93 D0 06 20 D2 FF 20 EA
C0C0:F8 C1 C9 85 D0 03 20 DF 73
C0C8:C3 C9 89 D0 03 20 16 C4 66
C0D0:CE 3E 03 AD 3E 03 D0 A2 C6
C0D8:AD 3F 03 8D 3E 03 EE 27 3D
C0E0:D0 AD 00 DC 29 1F 49 1F 7B
```

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C0E8:85 FB A5 FB 29 01 F0 0F DE
C0F0:CE 3D 03 AD 3D 03 C9 FF ED
C0F8:D0 05 A9 31 8D 3D 03 A5 79
C100:FB 29 02 F0 0F EE 3D 03 CC
C108:AD 3D 03 C9 32 D0 05 A9 37
C110:00 8D 3D 03 A5 FB 29 04 42
C118:F0 0F CE 3C 03 AD 3C 03 BF
C120:C9 FF D0 05 A9 4F 8D 3C D4
C128:03 A5 FB 29 08 F0 0F EE B9
C130:3C 03 AD 3C 03 C9 50 D0 BC
C138:05 A9 00 8D 3C 03 A5 FB B6
C140:29 10 D0 08 A9 02 8D 41 A8
C148:03 4C C0 C1 AD 3D 03 29 26
C150:01 0A 85 FB AD 3C 03 29 D4
C158:01 18 65 FB 85 FB AD 3C 82
C160:03 4A 85 FC AD 3D 03 4A 2B
C168:85 02 A9 ?? 85 FD A9 80 5C
C170:85 FE A2 00 18 A5 FD 65 83
C178:02 85 FD A5 FE 69 00 85 9B
C180:FE E8 E0 28 D0 EE 18 A5 74
C188:FD 65 FC 85 FD A5 FE 69 4A
C190:00 85 FE A6 FB 20 C3 C1 69
C198:AD 41 03 F0 15 18 A5 FE 06
C1A0:69 58 85 FE A0 00 AD 20 10
C1A8:D0 91 FD 38 A5 FE E9 58 91
C1B0:85 FE 38 A5 FE E9 7C 85 36
C1B8:FE A0 00 BD 92 C2 91 FD 80
C1C0:4C 7A C0 AD 41 03 C9 02 A7
C1C8:D0 11 A0 ?? B1 FD 3D 8E 9B
C1D0:C2 A0 00 C9 00 D0 01 C8 88
C1D8:3C 41 03 AC 41 03 F0 0B 21
C1E0:A0 00 B1 FD 1D 8E C2 91 05
C1E8:FD AA 60 A0 00 BD 8E C2 03
C1F0:49 0F 31 FD 91 FD AA 60 1D
C1F8:A9 00 85 FB 85 FD A9 04 3D
C200:85 FC A9 80 85 FE A0 ?? 2E
C208:B1 FB A2 00 DD 92 C2 F0 69
C210:03 E8 D0 F8 8A 91 FD C8 5A
C218:D0 EE E6 FC E6 FE A5 FC E9
C220:C9 08 D0 E2 A9 ?? 60 A9 8C
C228:00 8D 15 D0 A2 00 BD CE 20
C230:C2 9D A7 02 E8 E0 1A D0 63
C238:F5 A9 00 85 FB 20 E4 FF A5
C240:F0 FB C9 14 F0 20 C9 0D 60
C248:F0 30 C9 41 90 EF C9 5B D2
C250:B0 EB A6 FB E0 08 F0 E5 AC
C258:9D AA 02 9D B7 02 20 D2 4A
C260:FF E6 FB 4C 3D C2 A6 FB 22
C268:F0 D3 20 D2 FF A9 20 ?? 11
C270:A9 02 9D B6 ?? C6 FB 4C D9
C278:3D C2 A9 01 8D 15 D0 A5 9A
C280:FB F0 01 60 20 16 C4 68 B1
C288:68 68 68 4C 7A C0 01 02 09
C290:04 08 20 7E 7C E2 7B 61 CD
C298:FF EC 6C 7F E1 FB 62 FC 9F
C2A0:FE A0 93 05 4C 4F 41 44 F6
C2A8:2D 45 4E 54 45 52 20 46 1F
C2B0:49 4C 45 4E 41 4D 45 3A 7F
C2B8:93 05 53 41 56 45 2D 45 2F
C2C0:4E 54 45 52 20 46 49 4C 49
C2C8:45 4E 41 4D 45 3A 53 30 6B
C2D0:3A 20 ?? 20 20 20 20 20 63
C2D8:20 2E 53 53 30 3A 20 20 64
C2E0:20 20 20 20 ?? 20 2E 43 A5
C2E8:AD 3D 03 0A 0A 69 32 8D 7D
C2F0:01 D0 AD 3C 03 0A 0A 85 7E
C2F8:FB A9 00 69 00 85 02 18 AF
C300:A5 FB 69 18 8D ?? D0 A5 BB
C308:02 69 00 8D 10 D0 60 20 68
C310:DF C3 A2 00 BD A2 C2 20 EA
C318:D2 FF E8 E0 16 ?? F5 20 34
C320:27 C2 A9 08 AA A8 20 BA 94
C328:FF A9 0A A2 AA A0 02 20 81
C330:BD FF A9 ?? 20 D5 FF A9 CD
C338:08 AA A8 20 BA FF A9 0A B8
C340:A2 B7 A0 02 20 BD FF A9 DC
C348:00 20 D5 FF ?? 68 20 F8 B0
C350:C1 4C 7A C0 20 DF C3 A2 D1
C358:00 BD B8 C2 20 D2 FF E8 C7
C360:E0 16 D0 F5 20 27 C2 20 9A
C368:16 C4 A9 0F A8 A2 08 20 52
C370:BA FF A9 0D A2 A7 A0 02 52
C378:20 BD FF 20 C0 FF A9 0F E9
C380:20 C3 FF A9 0F A8 A2 08 0C
C388:20 BA FF A9 0D A2 B4 A0 66
C390:02 20 BD FF 20 C0 FF A9 86
C398:0F 20 C3 FF A9 08 A8 AA 91
C3A0:20 BA FF A9 0A A2 AA A0 52
C3A8:02 20 BD FF A9 00 85 FB 45
C3B0:A9 04 85 FC A9 FB A2 E9 FA
C3B8:A0 07 20 D8 FF A9 08 A8 43
C3C0:AA 20 BA FF A9 0A A2 B7 6F
C3C8:A0 02 20 BD FF A9 ?? 85 2D
C3D0:FB A9 D8 85 FC A9 FB A2 5D
C3D8:E9 A0 DB 20 D8 FF 60 A2 25
C3E0:00 BD 00 04 9D 00 04 BD CB
C3E8:00 05 9D 00 85 BD 00 06 8E
C3F0:9D 00 86 BD 00 07 9D 00 4B
C3F8:87 ?? 00 D8 9D 00 88 BD FC
C400:00 D9 9D 00 89 BD 00 DA D1
C408:9D 00 8A BD 00 DB 9D 00 38
C410:8B E8 D0 CD 8A 60 A2 00 AB
C418:BD ?? 84 9D 00 04 BD 00 76
C420:85 9D 00 05 BD 00 86 9D BC
C428:00 06 BD 00 87 9D ?? 07 A4
C430:BD ?? ?? 9D ?? D8 BD 00 62
C438:89 9D ?? D9 BD ?? 8A 9D 2C
C440:00 DA BD 00 8B 9D 00 DB E6
C448:E8 D0 CD 8A 4C F8 C1 00 A6
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BEFORE TYPING . . .

Before typing in programs, please refer to "How to Type In COMPUTE!'s Gazette Programs," elsewhere in this issue.

Memo Card

See instructions in article on page 24 before typing in.

Program 1: MEMOCARD.ML

```
C000:A9 00 85 02 20 FD AE 20 9D
C008:79 00 8D B1 C2 A9 80 8D 5E
C010:B2 C2 20 73 00 C9 24 F0 37
C018:19 09 80 8D B2 C2 20 73 A5
C020:00 D0 07 A9 FF 85 0D 4C CD
C028:8D AD C9 3A F0 7F C9 24 F5
C030:D0 EC 20 E3 C0 20 73 ?? 05
C038:20 F1 AE 20 8D AD 20 9B 1D
C040:BC A5 63 D0 6B A5 2F 85 D8
C048:FB A5 30 85 FC A0 01 B1 AD
C050:FB D9 B1 C2 D0 64 88 10 E1
C058:F6 A0 02 B1 FB 18 65 FB DF
C060:8D B5 C2 C8 B1 FB 65 FC 40
C068:8D B6 C2 AD B5 C2 38 E9 A4
C070:07 8D AE C2 AD B6 C2 E9 92
C078:00 8D AF C2 A2 03 A5 FB E7
C080:18 65 65 85 FB A5 FC 65 42
C088:64 85 FC CA D0 F0 A5 FC 7C
C090:CD AF C2 90 0B D0 19 A5 B9
C098:FB CD AE C2 90 02 B0 10 8B
C0A0:A5 FB 8D B3 C2 A5 FC 8D 15
C0A8:B4 C2 4C 06 C1 4C FD AE 09
C0B0:4C 45 B2 A9 FF 85 0D 4C 17
C0B8:8D AD A0 02 B1 FB 18 65 B3
C0C0:FB 8D B0 C2 C8 B1 FB 65 50
C0C8:FC 85 FC AD B0 C2 85 FB 3C
C0D0:A5 FC C5 32 90 0A D0 D8 67
C0D8:A5 FB C5 31 90 02 B0 D0 B6
C0E0:4C 4D C0 A5 7B 48 A5 7C 13
C0E8:48 A0 00 B1 7B F0 0B C9 51
C0F0:2C F0 0E C9 3A F0 03 C8 87
C0F8:D0 F1 68 85 7C 68 85 7B D0
C100:60 68 68 4C FD AE BA 86 46
C108:FC 86 FD 8A 38 E9 52 B0 D2
C110:01 60 69 02 85 FE A2 13 F9
C118:B5 0A 48 CA 10 FA 8A 86 17
C120:FC A9 00 48 48 18 AD B3 C2
C128:C2 69 07 85 19 AD B4 C2 4C
C130:69 ?? 85 1A 18 A0 02 AD AF
C138:B5 C2 AA C8 AD B6 C2 A8 9F
C140:38 8A E9 03 85 1B 48 98 B1
C148:E9 00 85 1C 48 D0 02 D0 8D
C150:D0 A2 03 B5 19 95 ?? CA 9E
C158:10 F9 18 A5 0A 65 0C AA 68
C160:A5 0B 65 0D 4A 85 ?? 8A 08
C168:6A 90 06 E9 01 B0 02 C6 3A
C170:0F 85 0E A0 00 B1 0E 85 11
C178:16 C8 B1 0E 85 17 C8 B1 1C
C180:0E 85 18 A0 ?? B1 0A 85 D9
C188:10 C8 B1 0A 85 11 C8 B1 D0
C190:0A 85 12 A2 ?? A5 10 C5 63
C198:16 90 03 E8 A5 16 85 1D E7
C1A0:A0 00 B1 11 D1 17 D0 07 4F
C1A8:C8 C4 1D 90 F5 E0 01 B0 54
C1B0:11 18 A5 0A 69 03 85 0A 84
C1B8:90 C9 E6 0B B0 C5 90 91 D3
C1C0:?? 8D A0 00 B1 0C 85 13 FF
C1C8:C8 B1 0C 85 14 C8 B1 0C 2A
C1D0:85 15 A2 00 A5 16 C5 13 D4
C1D8:90 03 E8 A5 13 85 1D A0 66
C1E0:?? B1 17 D1 14 D0 07 C8 8B
C1E8:C4 1D 90 F5 E0 01 ?? 13 07
C1F0:38 A5 0C E9 03 85 0C ?? 11
C1F8:C9 C6 0D 90 C5 B0 84 90 48
C200:BD D0 BD A5 0D C5 0B 90 D0
C208:69 D0 06 A5 0A C5 0C B0 C1
C210:61 A2 02 A0 02 B5 10 91 D1
C218:0C B5 13 91 0A CA 88 10 29
C220:F4 18 A5 0A 69 03 85 0A E7
C228:90 02 E6 0B 38 A5 0C E9 5E
C230:03 85 0C ?? 02 C6 0D A5 10
C238:0D C5 ?? ?? 35 ?? BE A5 30
C240:0C C5 0A B0 B8 90 2B D0 B8
C248:B8 A5 1B 48 A5 1C 48 A5 4F
C250:0C 85 1B A5 0D 85 1C 18 C9
C258:90 A5 18 A5 19 69 03 85 E6
C260:19 90 01 C8 84 1A C4 1C 75
C268:90 95 D0 26 C5 1B 90 8F 63
C270:B0 20 A5 19 A4 1A C4 0D C0
C278:90 08 ?? DE C5 0C 90 02 D1
C280:B0 D8 ?? E4 FD ?? C2 86 F8
C288:FD E4 FE B0 ?? A6 FC 9A 46
C290:D0 B5 68 85 1C 68 85 1B F9
C298:A6 1C E0 00 D0 BC A6 FC 58
C2A0:9A A2 00 68 95 0A E8 E0 2A
C2A8:14 90 F8 60 F8 60 8F 8F 79
C2B0:FF FF 8F 8F FF FF 8F 8F CF
C2B8:FF FF 8F 8F FF FF 8F 00 48
C2C0:4C 02 C3 4C F7 C2 4C A2 30
C2C8:C5 4C 17 C6 20 01 C6 A0 C6
C2D0:03 B1 2D 85 FB C8 B1 2D D5
C2D8:85 FC A0 2E 8A 91 2D A0 EC
C2E0:?? E0 ?? F0 0A B1 FD 91 52
C2E8:FB C8 F0 19 CA D0 F6 A9 7F
C2F0:20 91 FB C8 D0 FB 60 A9 D7
C2F8:00 8D 9F C5 8D A0 C5 8D 3A
C300:A1 C5 20 CC C2 20 E4 FF FA
C308:D0 FB A0 0A B1 2D 8D BB C4
C310:C6 8D BC C6 8D BD C6 CE 22
C318:?? C6 A0 11 B1 2D ?? B8 6B
C320:C6 A0 18 B1 2D 8D B5 C6 23
C328:A0 1F B1 2D 8D B6 C6 20 C5
C330:43 C5 A0 25 B1 2D 10 01 94
C338:60 20 DE C4 20 E4 FF F0 A5
C340:F8 C9 04 F0 F4 AC ?? 02 BD
C348:8C C0 C6 C0 02 F0 EA C0 95
C350:04 90 03 4C 9B C4 C9 5F 06
C358:F0 08 C9 85 90 07 C9 8E AE
C360:B0 03 4C 9B C4 C9 91 D0 85
C368:15 AD A0 C5 F0 C1 CE A0 23
C370:C5 AD A1 C5 38 ED B8 C6 88
C378:8D A1 C5 4C 2F C3 C9 11 D9
C380:D0 1B AD A0 C5 CD BD C6 9E
C388:F0 10 EE A0 C5 AD A1 C5 62
C390:18 6D B8 C6 8D A1 C5 4C CD
C398:2F C3 4C 2F C3 C9 1D D0 75
C3A0:2A EE A1 C5 EE 9F C5 AD B8
C3A8:9F C5 CD B8 C6 90 19 AD ??
C3B0:?? C5 CD BD C6 D0 ?? CE E9
C3B8:9F C5 CE A1 C5 4C 2F C3 F6
C3C0:A9 00 8D 9F C5 EE A0 C5 B9
C3C8:4C 2F C3 C9 9D D0 27 CE A4
C3D0:A1 C5 CE 9F C5 10 F1 AD 6E
C3D8:A0 C5 F0 0F CE A0 C5 AD 63
C3E0:B8 C6 8D 9F C5 CE 9F C5 90
C3E8:4C 2F C3 A9 00 8D A1 C5 B4
C3F0:8D 9F C5 4C 2F C3 C9 0D CD
```

```
C3F8:D0 26 AD A0 C5 CD BD C6 D9
C400:D0 05 A9 0D 4C 9B C4 AD 41
C408:A1 C5 38 ED 9F C5 18 6D 6B
C410:B8 C6 8D A1 C5 A9 00 8D D5
C418:9F C5 EE A0 C5 4C 2F C3 4C
C420:C9 93 D0 0C A0 00 A9 20 C6
C428:91 FB 88 D0 FB 4C 34 C4 D5
C430:C9 13 D0 0E A9 00 8D 9F 66
C438:C5 8D A0 C5 8D A1 C5 4C 43
C440:2F C3 C9 94 D0 24 AC A1 E6
C448:C5 C0 FF F0 1A A0 FE CC 12
C450:A1 C5 F0 09 B1 FB C8 91 6B
C458:FB 88 88 D0 F2 B1 FB C8 3F
C460:91 FB 88 A9 20 91 FB 4C E8
C468:2F C3 C9 14 D0 20 AC A1 F6
C470:C5 F0 18 A0 FC A9 20 91 86
C478:FB C8 D0 FB AC A1 C5 B1 35
C480:FB 88 91 FB C8 C8 D0 F7 1F
C488:4C CF C3 4C 2F C3 EA C9 91
C490:03 F0 08 AC A1 C5 91 FB E6
C498:4C A1 C3 A0 26 91 2D 20 25
C4A0:43 C5 A9 00 8D B7 C6 A0 EB
C4A8:25 91 2D AE BB C6 AD B8 C6
C4B0:C6 18 6D B7 C6 8D B7 C6 6F
C4B8:CA D0 F3 AC B7 C6 88 B1 C0
C4C0:FB C9 20 D0 05 88 C0 FF 97
C4C8:D0 F5 C8 98 A0 2D 91 2D E4
C4D0:AD C0 C6 29 06 F0 04 A0 69
C4D8:25 91 2D 4C 43 C5 CE BF 52
C4E0:C6 D0 55 CE BE C6 D0 50 9C
C4E8:A9 04 8D BF C6 A9 1B 8D 96
C4F0:BE C6 AD B5 C6 18 6D A0 AE
C4F8:C5 AA F0 3C 30 3A A9 04 B3
C500:85 FE A9 00 85 FD A9 28 E2
C508:20 39 C5 CA D0 F8 AD 9F BC
C510:C5 CD B8 C6 D0 0E A9 28 AF
C518:20 39 C5 AD B6 C6 20 39 DF
C520:C5 4C 30 C5 AD 9F C5 20 9B
C528:39 C5 AD B6 C6 20 39 C5 D1
C530:A0 00 B1 FD 49 80 91 FD 8F
C538:60 18 65 FD 85 FD 90 02 CD
C540:E6 FE 60 AE B5 C6 AC B6 CE
C548:C6 18 20 F0 FF A0 00 8C 5F
C550:BA C6 AD B5 C6 8D B7 C6 9E
C558:AD BB C6 8D BC C6 AD B8 70
C560:C6 8D B9 C6 AC BA C6 B1 E5
C568:FB 20 D2 FF EE ■■ C6 F0 35
C570:2D CE B9 C6 D0 EE EE B7 C1
C578:C6 A9 B6 20 D2 FF A9 0D A1
C580:20 D2 FF AD ■■ C6 8D B9 61
C588:C6 AE B7 C6 AC B6 C6 18 6C
C590:20 F0 FF AD B8 C6 8D B9 F8
C598:C6 CE BC C6 D0 C6 60 00 A1
C5A0:00 00 A9 01 A2 08 A0 00 E7
C5A8:20 BA FF A9 02 A2 FF A0 C8
C5B0:C5 20 BD FF 20 C0 FF A2 85
C5B8:01 20 C6 FF 20 F9 C5 20 3A
C5C0:EB C5 F0 1E A9 0D 20 D2 48
C5C8:FF 20 CF FF AA 20 CF FF CB
C5D0:20 CD BD A9 20 20 D2 FF 59
C5D8:20 CF FF F0 E2 20 D2 FF B4
C5E0:D0 F6 A9 01 20 C3 FF 20 0B
C5E8:CC FF 60 20 CF FF 85 FB 6E
C5F0:20 CF FF 05 FB 60 20 F9 6C
C5F8:C5 20 CF FF 4C CF FF 24 2F
C600:30 20 FD AE 20 8B B0 A0 89
C608:00 B1 47 AA C8 B1 47 85 B6
C610:FD C8 B1 47 85 FE 60 20 82
C618:01 C6 8E C2 C6 A5 FD 8D 2C
C620:8D C6 A5 FE 8D 8E C6 20 1F
C628:01 C6 A5 47 85 FB A5 48 C0
C630:85 FC A5 FB 18 A0 02 71 EC
C638:2F 8D B8 C6 A5 FC A0 03 A9
C640:71 2F 8D B9 C6 A9 01 8D 0C
C648:BA C6 A9 00 8D C1 C6 A9 C4
C650:03 18 65 FB 85 FB 90 02 11
C658:E6 FC A5 FC CD B9 C6 90 90
C660:11 A5 FB CD B8 C6 90 0A 48
C668:A9 00 A0 25 91 2D C8 91 95
C670:2D 60 A0 00 B1 FB 8D B7 11
C678:C6 C8 B1 FB 85 FD C8 B1 F8
C680:FB 85 FE A9 00 AA A8 CC B0
C688:B7 C6 ■■ 0C BD C3 C6 D1 D6
C690:FD F0 0D A2 ■■ C8 D0 EF D9
C698:EE BA C6 D0 B2 EE C1 C6 CD
C6A0:E8 C8 EC C2 C6 D0 E0 A0 7A
C6A8:26 AD BA C6 91 2D 88 AD 7B
C6B0:C1 C6 91 2D 60 FF 8F 8F 87
C6B8:FF FF 8F 8F FF FF 8F 00 50
C6C0:70 70 00 00 70 70 00 00 E7
C6C8:70 70 00 00 70 70 00 00 EF
C6D0:70 70 00 ■■ 70 70 00 00 F7
C6D8:70 70 00 00 70 70 00 00 FF
C6E0:70 70 00 00 70 70 00 00 08
C6E8:70 70 00 00 70 70 00 00 10
C6F0:70 70 00 00 70 70 00 00 18
C6F8:70 70 00 00 70 70 00 00 20
C700:00 00 FF FF 8F 88 FF FF 2E
C708:8F 8F FF FF 8F 8F FF 70 6E
C710:8F 8F FF FF 8F 8F FA FF FB
C718:8F 8F FF FF 8F 8F FF FF 0E
C720:8F 8F FF FF 8F 8F FF FF 16
C728:8F 8F FF FF 8F 8F FF FF 1E
C730:8F 8F FF FF 8F 8F FF FF 26
C738:8F 8F FF FF 8F 8F FF 70 9E
C740:00 00 70 70 00 00 70 70 36
C748:00 00 70 70 00 00 70 70 3E
C750:00 00 70 70 00 00 70 70 46
C758:00 00 70 70 ■■ 00 70 70 4E
C760:00 00 70 70 00 ■■ 70 70 56
C768:00 00 70 70 00 00 70 70 5E
C770:00 00 70 70 00 00 70 70 66
C778:00 00 70 70 00 00 70 70 6E
C780:00 00 FF FF 8F 88 FF FF AE
C788:8F 8F FF FF 8F 8F FF 70 EE
C790:8F 8F FF FF 8F 8F FA FF 7C
C798:8F 8F FF FF 8F 8F FF FF 8E
C7A0:8F 8F FF FF 8F 8F FF FF 96
C7A8:8F 8F FF FF 8F 8F FF FF 9E
C7B0:8F 8F FF FF 8F 8F FF FF A6
C7B8:8F 8F FF FF 8F 8F FF 70 1F
C7C0:00 00 70 70 00 ■■ ■■ 00 65
```

Program 2: Memo Card

```
QA 100 REM COPYRIGHT 1989 COMP
       UTE! PUBLICATIONS, INC.
       {2 SPACES}ALL RIGHTS RE
       SERVED.
QR 110 PRINT"{CLR}"TAB(12)"COP
       YRIGHT 1989":PRINTTAB(6
       )"COMPUTE! PUBLICATIONS
       , INC."
HJ 120 PRINTTAB(10)"ALL RIGHTS
        RESERVED"
AX 130 IF A=0 THEN A=1:LOAD"ME
       MOCARD.ML",8,1
JD 140 POKE 53281,0:POKE 53280
       ,15:POKE646,3:PRINT"
       {CLR}"CHR$(14)CHR$(8):C
       LR
RA 150 DIM SY$,H%,W%,SY%,SX%,F
       %,LE%:PRINTCHR$(16):C2=
       -1
XE 160 MX=300:DIM MS$(MX),TY%(
       MX)
KJ 170 SY$=" ":FORI=1TO7:SY$=S
       Y$+SY$:NEXT:SY$=SY$+LEF
       T$(SY$,127)
BP 180 SP$=LEFT$(SY$,11):SS$=L
       EFT$(SY$,39):SH$=CHR$(1
       9)+SS$+CHR$(19)
QG 190 DN$="{DOWN}":RT$="
       {RIGHT}":FORI=1 TO 6:DN
       $=DN$+DN$:RT$=RT$+RT$:N
       EXT:DN$ "{HOME}"+DN$
GA 200 A9=49856
MA 210 H%=7:W%=36:SX%=2:SY%=4:
       CN=0:AD=A9+3
ER 220 PRINT"{CLR}{2 DOWN}"TAB
       (15)"{8}MEMO CARD{CYN}"
       :GOSUB1170
RE 230 A$=MS$(CN):IF CN>HR THE
       N HR=CN
RB 240 PRINTLEFT$(DN$,SY%-1)
MA 250 PRINT" {2 @}{RVS} CARD
       {SPACE}#";STR$(CN)" ";
MX 260 IF CN<100 THEN PRINT" "
       ;:IF CN<10 THEN PRINT"
       {SPACE}";
RH 270 PRINT"{OFF}{24 @}"
RS 280 FORI=1 TO H%:PRINTSPC(S
       X%-1)"{J}":NEXT
AJ 290 PRINTSPC(SX%-1)"{38 T}"
CR 300 A$=MS$(CN):SYSAD,A$:MS$
       (CN)=LEFT$(SY$,LE%)
RR 310 IF F%>132ANDF%<142THENO
       NF%-132GOTO360,390,440,
       1280,500,520,580,1390
CD 320 IF F%<1024 OR F%>1044 T
       HEN AD=A9:GOTO300
PP 330 T=F%-1024:ON T GOTO600,
       760,770,350,980,350,990
       ,1000,350,350,350
KM 340 ON T-10 GOTO350,350,350
       ,1010,640,1030,1070,710
       ,700,640
AJ 350 AD=A9:GOTO300
KE 360 GOSUB740:IF CN=>MX THEN
       300
FK 370 CN=CN+1:AD=A9+3:IF CN>H
       R THEN HR=CN
QP 380 GOTO230
ES 390 GOSUB1540:IF A=0 THEN23
       0
FX 400 PRINTSH$;"PRINTING..."
CK 410 OPEN4,4,7:PRINT#4,RE$:P
       RINT#4,LC$;" #";CN;RE$:
       A$=MS$(CN)
SK 420 FOR I=0TOH%-1:PRINT#4,"
       {DOWN}"MID$(A$,I*W%+1,W
       %):NEXT
BR 430 PRINT#4:CLOSE4:PRINTSH$
       :GOTO220
JQ 440 IF MS$(MX)="" THEN460
EB 450 T$="INSERT AND DESTROY
       {SPACE}RECORD"+STR$(MX)
       :GOSUB1120:IF A=0 THEN2
       30
KM 460 T=HR+1:IF T>MX THEN T=M
       X
XF 470 FOR I=T TO CN+1 STEP-1:
       MS$(I)=MS$(I-1):NEXT:MS
       $(CN)="":HR=HR+1
JJ 480 IF HR>MX THEN HR=MX
RC 490 GOSUB740:GOTO230
AJ 500 GOSUB740:IF CN>0 THEN C
       N=CN-1:GOTO230
XB 510 AD=A9:GOTO300
PH 520 GOSUB1540:IF A=0 THEN23
       0
EG 530 PRINTSH$;"PRINTING..."
BG 540 OPEN4,4,7:PRINT#4,RE$
SK 550 FOR J=CNTOHR:A$=MS$(J):
       PRINT#4,LC$;" #";J;RE$:
       PRINT#4,"{DOWN}";
KS 560 FOR I=0TOH%-1:PRINT#4,"
       {DOWN}"MID$(A$,I*W%+1,W
       %):NEXT:NEXT
MH 570 PRINT#4:CLOSE4:PRINTSH$
       :GOTO220
FE 580 FOR I=CN+1 TO HR:MS$(I-
       1)=MS$(I):NEXT:MS$(HR)=
       ""
MH 590 HR=HR-SGN(HR):GOTO230
QE 600 IF SY%<>4 THEN630
JF 610 SY%=13:IF C2=-1 THEN C2
       =CN:GOTO230
SC 620 C2=CN:CN=C3:GOTO230
XD 630 C3=CN:SY%=4:CN=C2:GOTO2
       30
KX 640 PRINTSH$;"SORTING...":S
       YS49152,MS$(0)
BE 650 T=0:FOR I=0 TO MX
MX 660 IF MS$(I)<>"" THEN T=I:
       I=366
FP 670 NEXT
PS 680 FOR I=T TO MX:MS$(I-T)=
       MS$(I):MS$(I)="":NEXT
QB 690 HR=MX-T:PRINTSH$:GOTO23
       0
```

```
HG 700 PRINTSH$"ENTER SEARCH S
       TRING";:INPUTS$
JP 710 SYSA9+9,S$,MS$(CN)
EH 720 IF F%=0 THEN T$=S$+" NO
       T FOUND":GOSUB1090:GOTO
       300
MC 730 CN=CN+F%:GOTO230
SA 740 AD=A9+3:T=FRE(8):IF T<6
       00 AND T>0 THEN PRINTSH
       $"{RVS}WARNING: LOW ON
       {SPACE}MEMORY"
KE 750 RETURN
EH 760 CN=0:GOTO230
DS 770 NY=0
SF 780 Y 0:Z 21:Z1=22:GOSUB900
JG 790 POKE 1067+Y*40,32:Y=NY:
       POKE1067+Y*40,62:POKE55
       339+Y*40,7
GG 800 GETA$:IF A$=CHR$(13) TH
       EN CN=CN+Y:GOTO220
BJ 810 IF A$<>CHR$(145) THEN86
       0
RG 820 IF Y>0 THEN NY=Y-1:GOTO
       790
JJ 830 IF CN=0 THEN800
BQ 840 NY=Z:CN=CN-Z1:IF CN<0 T
       HEN NY=NY+CN:CN=0
QQ 850 GOTO780
SM 860 IF A$<>CHR$(17) THEN800
ME 870 IF Y<MY THEN NY=Y+1:GOT
       O790
EJ 880 IF CN>HR-Z1 THEN800
QG 890 CN=CN+Z1:NY=0:GOTO780
RP 900 PRINT"{CLR}{RVS} USE CU
       RSOR KEYS, RETURN TO SE
       LECT"
QQ 910 FOR K=0 TO Z:T=K+CN
QK 920 IF T>HR THEN K=Z:PRINT"
       --END OF FILE--":GOTO97
       0
SB 930 MY=K:T$=RIGHT$(STR$(T),
       3)
KX 940 IF T<100 THEN T$=STR$(T
       ):IF T<10 THEN T$=" "+S
       TR$(T)
PA 950 PRINT T$;" "LEFT$(MS$(T
       ),35);:IF MS$(T)="" THE
       N PRINT"-BLANK-";
EB 960 PRINT:IF K=Z THEN PRINT
       "--MORE--"
PH 970 NEXT:RETURN
AF 980 CN=HR:GOTO230
JK 990 BU$=MS$(CN):T$="BUFFER
       {SPACE}STORED":GOSUB109
       0:GOTO230
CF 1000 HF=1-HF:GOSUB1170:GOTO
       230
GC 1010 T$="ERASE ALL DATA":GO
       SUB1120:IF A=0 THEN230
XK 1020 FOR K=0 TO HR:MS$(K)="
       ":NEXT:HR=0:GOTO210
CE 1030 IF BU$="" THEN T$="BUF
       FER EMPTY, PLEASE GET
       {SPACE}BEFORE PUT":GOS
       UB1090:GOTO230
KE 1040 IF MS$(CN)="" THEN1060
GE 1050 T$="REPLACE CURRENT DA
       TA":GOSUB1120:IF A=0 T
       HEN230
GE 1060 MS$(CN)=BU$:GOTO230
QQ 1070 T$="EXIT PROGRAM":GOSU
       B1120:IF A THEN PRINT"
       {CLR}"CHR$(9)CHR$(142)
       :END
GB 1080 GOTO230
DE 1090 PRINTSH$;T$:FOR K=1 TO
        999
PQ 1100 IF PEEK(198) THEN K=99
       9:IF PEEK(197)=60 THEN
        GETA$
GS 1110 NEXT K:PRINTSH$:RETURN
PD 1120 PRINTSH$;T$;" (Y/N)?"
CG 1130 GETQ$:IF Q$="Y" THEN A
       =1:GOTO1160
KC 1140 IF Q$="N" THEN A=0:GOT
       O1160
DK 1150 GOTO1130
FH 1160 PRINTSH$:RETURN
SR 1170 PRINTLEFT$(DN$,21):PRI
       NTSS$:PRINTSS$:PRINTSS
       $:PRINTSS$;
DR 1180 PRINTLEFT$(DN$,21)
AM 1190 IF HF THEN1240
JA 1200 PRINT" {CYN}F1{8} NEXT
       {4 SPACES}{CYN}F2{8} P
       REVIOUS{6 SPACES}{CYN}
       PRESS"
CD 1210 PRINT" F3{8} PRINT
       {3 SPACES}{CYN}F4{8} P
       RINT TO END{2 SPACES}
       {CYN}CTRL H FOR"
SP 1220 PRINT" F5{8} INSERT
       {2 SPACES}{CYN}F6{8} D
       ELETE{8 SPACES}{CYN}AD
       DITIONAL"
JX 1230 PRINT" F7{8} LOAD
       {4 SPACES}{CYN}F8{8} S
       AVE{10 SPACES}{CYN}COM
       MANDS";:RETURN
SX 1240 PRINTTAB(10)"{RVS} CON
       TROL COMMANDS: {OFF}"
CG 1250 PRINT" {CYN}A{8}LTERNA
       TE CARD{2 SPACES}{CYN}
       B{8}EGIN{2 SPACES}
       {CYN}G{8}ET{5 SPACES}
       {CYN}H{8} FKEYS"
QC 1260 PRINT" {CYN}S{8}EARCH
       {10 SPACES}{CYN}E{8}ND
       {4 SPACES}{CYN}P{8}UT
       {5 SPACES}{CYN}T{8} SO
       RT"
HK 1270 PRINT" {CYN}R{8}EPEAT
       {SPACE}SEARCH
       {3 SPACES}{CYN}N{8}EW
       {4 SPACES}{CYN}C{8}HOO
       SE{2 SPACES}{CYN}Q{8}U
       IT{CYN}";:RETURN
JP 1280 F$="":PRINTSH$"ENTER F
       ILENAME ($ DIR)";:INPU
       TF$
RS 1290 IF F$="" THEN PRINTSH$
       :GOTO220
DK 1300 IF F$="$" THEN PRINT"
       {CLR}":SYSA9+6:GOTO128
       0
FC 1310 Q$="":OPEN2,8,2,F$+",P
       ,R":CLOSE2:OPEN15,8,15
       :INPUT#15,A,B$:CLOSE15
BH 1320 IF A=0 THEN OPEN1,8,2,
       F$+",P,R":GOTO1350
DJ 1330 IF A<>62 THEN T$=" DIS
       K ERROR":GOSUB1090:GOT
       O1280
EH 1340 T$=" FILE NOT FOJND -
       {SPACE}ERROR":GOSUB109
       0:GOTO1280
PG 1350 INPUT#1,HR:FOR I=0TOHR
       :INPUT#1,MS$(I):IF MS$
       (I)="<" THEN MS$(I)=""
ER 1360 NEXT:CLOSE1
QC 1370 C2=-1:C3=0:SY%=4:CN=0
AM 1380 T$=STR$(HR+1)+" RECORD
       S LOADED":GOSUB1090:GO
       TO210
XA 1390 F$="":PRINTSH$"ENTER N
       AME FOR SAVE";:INPUTF$
JF 1400 IF F$="" THEN PRINTSH$
       :GOTO230
BA 1410 IF F$="$" THEN PRINT"
       {CLR}":SYSA9+6:T$="-DO
       NE-":GOSUB1090:GOTO139
       0
MP 1420 Q$="":OPEN2,8,2,F$+",P
       ,R":CLOSE2:OPEN15,8,15
       :INPUT#15,A,B$:CLOSE15
MQ 1430 IF A=62 THEN OPEN2,8,2
       ,F$+",P,W":GOTO1500
XE 1440 IF A=0 THEN GOTO1460
QJ 1450 T$=" DISK ERROR ":GOSU
       B1090:GOTO1390
FX 1460 T$="FILE EXISTS, OVERW
       RITE":GOSUB1120
SE 1470 IF A=0 THEN220
ED 1480 OPEN1,8,15:PRINT#1,"S0
       :";F$:CLOSE1:GOTO1420
SP 1490 RE$=CHR$(15):GM$=CHR$(
       8):LC$=CHR$(14)
GB 1500 PRINT#2,HR:FOR I=0TOHR
       :PRINT#2,MS$(I)
CM 1510 IF MS$(I)=""THEN PRINT
       #2,"<"
SD 1520 NEXT:PRINT#2," ":CLOSE
       2
GK 1530 T$=STR$(HR+1)+" RECORD
       S SAVED":GOSUB1090:GOT
       O230
HF 1540 A=1:OPEN7,4,7:CLOSE7:T
       =ST
QS 1550 OPEN7,4:IF ST=T THEN C
       LOSE7:RETURN
PA 1560 PRINTSH$"PRINTER NOT R
       EADY, PRESS < TO CANCE
       L"
PR 1570 GETA$:IF A$="<" THEN A
       =0:CLOSE7:PRINTSH$:RET
       URN
GF 1580 IF A$="" THEN T=T+1:IF
        T<9 THEN1570
PA 1590 T=0:PRINTSH$:CLOSE7:GO
       TO1540
```

BEFORE TYPING . . .

Before typing in programs, please refer to "How to Type In COMPUTE!'s Gazette Programs," elsewhere in this issue.

Block Battle!

Article on page 20.

```
FF 5 REM COPYRIGHT 1989 COMPUT
     E! PUBLICATIONS, INC. - A
     LL RIGHTS RESERVED
SP 10 GOTO1310
ES 20 W=.:GF=W:YF=W:FORZ=WTO5:
     IFP(Z,7)=1THENGF=GF+1
KC 30 IFP(Z,.)=2THENYF=YF+1
RB 40 NEXT:IFGF=6ORYF=6THENW=P
     :RETURN
XQ 50 IFGT=.ANDYT=.THENW=3:RET
     URN
XQ 60 IFGT=.THENW=2:RETURN
FK 70 IFYT=.THENW=1:RETURN
SC 80 IFGF>=YFANDGF>YTTHENW=1:
     RETURN
EQ 90 IFYF>=GFANDYF>GTTHENW=2:
     RETURN
PM 100 IFGF=YFANDGT=YT ANDGF=G
     TTHENW=3
GQ 110 RETURN
QD 120 POKE646,19-P*6
FK 130 L=LEN(M$):J=38-L/2:K=L-
     19:FORI=1TOK:POKE214,22
     :PRINT
PJ 140 PRINTSPC(J)LEFT$(M$,I)R
     IGHT$(M$,L-(L-I)):J=J-1
     :NEXT:RETURN
KC 150 POKEV+41,1:GOSUB290:IFE
     =1OR(PEEK(56322-P)AND16
     ) .GOTO210
JB 160 IFX<.ORX>7THENX=-7*(X<.
     )
```

```
HC 170 IFY<.ORY>5THENY=-5*(Y<0
       )
RB 180 IFX>5THENPOKEV+16,4:POK
       EV+4,X*40-224:GOTO200
HF 190 POKEV+16,.:POKEV+4,X*40
       +32
KS 200 POKEV+5,Y*32+58:POKEV+2
       1,4:GOTO150
ER 210 IFQ=1ANDP(Y,X)<>PTHENR=
       1:GOTO280
EQ 220 IFQ=2AND(X=.ORX=7)GOTO
       {SPACE}150
AJ 230 M$="{9 SPACES}INDICATE
       {SPACE}A DIRECTION
       {8 SPACES}{HOME}":GOSUB
       120:A=X:B=Y
CH 240 GOSUB290:IFX=AANDY=BGOT
       O240
HA 250 IFQ=2GOTO280
JK 260 IFX<.ORX>7THENX=-7*(X>7
       )
KQ 270 IFY<.ORY>5THENY=-5*(Y>5
       )
BF 280 POKEV+21,.:RETURN
QD 290 JY=PEEK(56322-P)AND15:G
       =PEEK(653):E=PEEK(197)
HB 300 X=X+(JY=11)-(JY=7)+(G=1
       ANDE=2)-(G=.ANDE=2)
SA 310 Y=Y+(JY 14)-(JY=13)+(G=
       1ANDE=7)-(G=.ANDE=7):RE
       TURN
HS 320 D=32:IFR(B,A)=1THEND=16
       0
SQ 330 IFB(B,A)=1THEND=224
PA 340 GOSUB350:RETURN
RK 350 Z=49193:GOTO 370
HG 360 Z=55337
KM 370 F=Z+A*5+B*160
GD 380 POKEF,D:POKEF+1,D:POKEF
       +2,D:POKEF+40,D:POKEF+4
       1,D:POKEF+42,D:RETURN
CF 390 F=49193+X*5+Y*160:POKEF
       ,99:POKEF+1,100:POKEF+2
       ,101:POKEF+40,102
PG 400 POKEF+41,103:POKEF+42,1
       04:RETURN
DJ 410 R=.:IFX<.ORX>7ORY<.ORY>
       5THENR=1:RETURN
PM 420 IFXANDX<>7ANDP(Y,X)>.TH
       ENR=1:RETURN
XF 430 IFX=.ANDP=1ANDP(Y,X)>.T
       HENR=1
GP 440 IFX=.ANDP=2ANDP(Y,X)=2T
       HENR=1
DS 450 IFX=7ANDP=1ANDP(Y,X)=1T
       HENR=1
MR 460 IFX=7ANDP=2ANDP(Y,X)>.T
       HENR=1
KH 470 IFTR>1ANDXANDX<>7ANDB(Y
       ,X)=.ANDR(Y,X)=.THENR=1
PD 480 IFTR>1THENRETURN
RB 490 IFXANDX<>7AND(B(Y,X)=.O
       RR(Y,X)=.)THENR=1
QF 500 RETURN
XE 510 P=2+(P=2):IFP=1ORC<>1GO
       TO700
AC 520 M$="{10 SPACES}THE COMP
       UTER MOVES{9 SPACES}
       {HOME}":GOSUB120:TR=1
FX 530 A=.:B=-1:IFTR>2THENA=IN
       T(6*RND(1))
PH 540 B=B+1:IFB>5THENB=.:A=A+
       1
JD 550 IFA>7THENTR=TR+1:GOTO53
       0
CE 560 IFP(B,A)<2GOTO 540
QK 570 X=A:Y=B:IFA=.THENY=-1:G
       OTO640
DP 580 Y=B:X=A-1:GOSUB410:IF R
       =.GOTO 690
QR 590 IFTR<3GOTO540
SE 600 Y=B-1:X=A:GOSUB410:IFR=
       .GOTO690
PJ 610 Y=B+1:GOSUB410:IFR=.GOT
       O690
KH 620 IFTR<4GOTO680
AP 630 Y=B:X=X+1:GOSUB410:ONR+
       1GOTO690,540
PK 640 Y=Y+1:IFY>5GOTO580
JF 650 ONP(Y,X)+1GOTO640,660,6
       40
QH 660 IFY>BTHENY=B+1:GOTO680
QP 670 Y=B-1
FD 680 GOSUB410:ONRGOTO540
FJ 690 TR=1:GOTO720
BM 700 M$="{12 SPACES}CHOOSE A
        BLOCK{11 SPACES}{HOME}
       ":GOSUB120:Q=1:Y=1:X=(P
       -1)*7:R=.
HC 710 GOSUB150:ONRGOTO700
PE 720 TR=2:GOSUB410:ONRGOTO70
       0
MS 730 IF P(Y,X)=.GOTO760
GR 740 IFP=1THENYT=YT-1:GOTO76
       0
RE 750 GT=GT-1
MS 760 POKEV+39,19-P*6:POKEV+4
       0,11
BF 770 IFA>5THENPOKEV+16,3:POK
       EV,A*40-224:POKEV+2,A*4
       0-224:GOTO790
DH 780 POKEV+16,.:POKEV,A*40+3
       2:POKEV+2,A*40+32
XK 790 POKEV+1,B*32+58:POKEV+3
       ,B*32+58:POKEV+21,3:IFA
       ANDA<>7THENGOSUB320:GOT
       O810
JX 800 D=106:GOSUB350:D=12:GOS
       UB360
MS 810 P(B,A)=.:P(Y,X)=P:I=A*4
       0+32:K=B*32+58:FORZ=1TO
       8
JG 820 O=I+Z*5*(X-A):IF O>255
       {SPACE}THEN POKE V+16,3
       :POKEV,O-256:POKEV+2,O-
       256:GOTO840
DD 830 POKEV+16,.:POKEV,O:POKE
       V+2,O
PX 840 O=K+Z*4*(Y-B):POKEV+1,O
       :POKEV+3,O:NEXT
CQ 850 GOSUB390:D=19-P*6:F=F+6
       144:GOSUB380:POKEV+21,.
       :GOSUB20:IFWGOTO1250
GC 860 IFP=1ORC<>1GOTO1100
QM 870 A=6:B=-1
HS 880 B=B+1:IFB>5THENB=.:A=A-
       1
FX 890 IFA=.GOTO1030
QF 900 IFP(B,A)<>1GOTO880
BK 910 IFB(B,A)>.ANDR(B,A)>.GO
       TO880
BJ 920 ONR(B,A)GOTO980
AB 930 Y=B:X=A-1:IF X<1 THEN X
       =6
GA 940 IFB(Y,X)=.THENX=A+1:GOT
       O1110
DS 950 X=A+1:IF X>6 THEN X=1
AQ 960 IFB(Y,X)=.THENX=A-1:GOT
       O1110
AH 970 GOTO880
BP 980 Y=B+1:X=A:IFY>5THENY=.
DE 990 IFR(Y,X)=.THENY=B+1:GOT
       O1110
GA 1000 Y=B-1:IFY<.THENY=5
XP 1010 IFR(Y,X)=.THENY=B-1:GO
        TO1110
JA 1020 GOTO880
ER 1030 A=2:B=-1
DQ 1040 B=B+1:IFB>5THENB=.:A=A
        +1
ED 1050 IFA>7GOTO1090
QB 1060 IFP(B,A)<2GOTO1040
MQ 1070 IFB(B,A-1)>.ORR(B,A-1)
        >.GOTO1040
DS 1080 A=A-1:X=A:Y=B+1:GOTO11
        10
JB 1090 A=2:B=5:X=1:Y=B:GOTO11
        10
DX 1100 M$="{12 SPACES}CHOOSE
        {SPACE}A STRIP
        {11 SPACES}{HOME}":GOS
        UB120:Q=2:GOSUB150
XM 1110 U=X-A:T=Y-B:H=1:IFU=.T
        HENH=.:GOTO1150
AE 1120 IFU=1GOTO1140
QM 1130 Z=B(B,1):FORA=1TO5:B(B
        ,A)=B(B,A+1):NEXT:B(B,
        6)=Z:GOTO1180
FX 1140 Z=B(B,6):FORA=6TO2STEP
        -1:B(B,A)=B(B,A-1):NEX
        T:B(B,1)=Z:GOTO1180
AK 1150 IFT=1GOTO1170
DB 1160 Z=R(.,A):FORB=.TO4:R(B
        ,A)=R(B+1,A):NEXT:R(5,
        A)=Z:GOTO1180
ME 1170 Z=R(5,A):FORB=5TO1STEP
        -1:R(B,A)=R(B-1,A):NEX
        T:R(.,A)=Z
DA 1180 FORN=HTOH+5:IFU=.THENB
        =N:GOTO1200
CH 1190 A=N
SK 1200 IFP(B,A)=.THENGOSUB320
        :GOTO1240
QS 1210 IFB(B,A)>.ORR(B,A)>.GO
        TO1240
EF 1220 D=32:GOSUB350:FOR Z=8T
        072:POKE53270,Z:NEXT
RR 1230 GT=GT+(P(B,A)=1):YT=YT
        +(P(B,A)=2):P(B,A)=.
PE 1240 NEXT:GOSUB20:IFW=.GOTO
        510
BQ 1250 PRINT"{WHT}":ONWGOTO12
        70,1280
KG 1260 M$="{14 SPACES}TIE GAM
        E!{14 SPACES}{HOME}":G
        OTO1300
JC 1270 M$="{10 SPACES}GREEN P
        LAYER WINS!{9 SPACES}
        {HOME}":GOTO1300
RX 1280 IFC=2THENM$="
        {9 SPACES}YELLOW PLAYE
        R WINS!{9 SPACES}
        {HOME}":GOTO1300
XS 1290 M$="{10 SPACES}THE COM
        PUTER WINS!{9 SPACES}
        {HOME}"
AJ 1300 GOSUB130:POKE198,.:WAI
        T198,1:P=W:GOTO1500
FS 1310 PRINTCHR$(142)CHR$(8):
        X=RND(-TI)
KC 1320 POKE781,9:POKE782,1:PO
        KE90,.:POKE91,216:POKE
        88,.:POKE89,248:POKE56
        333,127
GG 1330 POKE1,51:SYS41964:POKE
        1,55:POKE56333,129:POK
        E56578,PEEK(56578)OR3
KP 1340 POKE56576,PEEK(56576)A
        ND252:POKE53272,PEEK(5
        3272)AND15:POKE648,192
AP 1350 POKE53272,(PEEK(53272)
        AND240)OR12:PRINT"
        {CLR}"
RG 1360 M$="{HOME}{YEL}
        {10 SPACES}ONE MOMENT
        {SPACE}PLEASE...
        {6 SPACES}":GOSUB120
QX 1370 DATA255,255,255,255,24
        5,250,245,250,255,255,
        255,255,85,170,85,170,
        255,254
PP 1380 DATA252,248,80,160,80,
        160,245,250,245,250,24
        0,224,192,128,85,170,8
        5,170,,,
SX 1390 DATA,80,160,80,160,,,,
        ,245,250,245,250,245,2
        50,245,250,85,170,85,1
        70,85
```

```
FG 1400 DATA170,85,170,80,160,
        80,160,80,160,80,160,2
        55,255,255,128,,1,128,
        24,1,128
AJ 1410 DATA60,1,128,126,1,132
        ,24,33,140,24,49,159,2
        55,249,159,255,249,140
        ,24,49
DH 1420 DATA132,24,33,128,126,
        1,128,60,1,128,24,1,12
        8,,1,255,255,255,,,,,,
        ,,,,,,,
EK 1430 DATA,,,255,255,255,255
        ,255,254,255,255,252,2
        55,255,248,245,85,80,2
        50,170
PJ 1440 DATA160,245,85,80,250,
        170,160,245,85,80,250,
        170,160,245,85,80,250,
        170,160
BQ 1450 DATA240,,,224,,,192,,,
        128,,,,,,,,,,,,,,,,,
XE 1460 FORA=.TO71:READB:POKE6
        1720+A,B:NEXT:FORX=.TO
        126:READY:POKE62080+X,
        Y:NEXT
HB 1470 FORGF=.TO47:POKE62208+
        GF,255:NEXT:FORYF=.TO1
        4:POKE62256+YF,.:NEXT
EB 1480 POKE50168,203:POKE5016
        9,204:POKE50170,202:A$
        ="{T}{3 @}{G}":B$="E
        {3 SPACES}{Q}":C$="{+}
        {3 M}{£}"
XC 1490 G$="£{3 N}{Q}":V=5324
        8:P=2
BP 1500 FORA=.TO7:FORB=.TO5:R(
        B,A)=.:B(B,A)=.:P(B,A)
        =.:NEXT:NEXT
CA 1510 POKE53280,.:POKE53281,
        .:POKE53282,11:POKE532
        84,6:POKE53265,PEEK(53
        265)OR64
QM 1520 GT=6:YT=6:PRINT"{CLR}
        {2 UP}";:FORQ=1TO6:PRI
        NT"{5}"A$"{WHT}"A$A$A$
        A$A$A$"{5}"A$;
MJ 1530 PRINTG$"{WHT}"B$B$B$B$
        B$B$"{5}"G$;:PRINTG$"
        {WHT}"B$B$B$B$B$B$"{5}
        "G$;
ER 1540 PRINTC$"{WHT}"C$C$C$C$
        C$C$"{5}"C$;:NEXT:FORQ
        =1TO2:X=.:D=13:IFQ=2TH
        ENX=7:D=7
RM 1550 A=X:FORY=.TO5:P(Y,X)=Q
        :GOSUB390:B=Y:GOSUB360
        :NEXT:NEXT:FORX=1TO6:C
        =.
EJ 1560 Y=INT(6*RND(1)):ONR(Y,
        X)GOTO1560
GX 1570 R(Y,X)=1:A=X:B=Y:D=160
        :GOSUB350:C=C+1:IFC<4G
        OTO1560
ES 1580 NEXT:FORY=.TO5:C=.
JF 1590 X=INT(6*RND(1))+1:IFB(
        Y,X)=1GOTO1590
QM 1600 B(Y,X)=1:A=X:B=Y:D=224
        :GOSUB350:C=C+1:IFC<3G
        OTO1590
KM 1610 NEXT:PRINT"{WHT}{HOME}
        ":M$="{13 SPACES}BLOCK
         BATTLE!{11 SPACES}
        {HOME}":GOSUB130
XS 1620 GOSUB1670:M$="
        {6 SPACES}COPYRIGHT 19
        89 COMPUTE!{8 SPACES}
        {HOME}":GOSUB130:GOSUB
        1670
CF 1630 M$="{9 SPACES}ALL RIGH
        TS RESERVED{9 SPACES}
        {HOME}":GOSUB130:GOSUB
        1670
QA 1640 M$="{9 SPACES}{1} OR {
        2} PLAYERS?{9 SPACES}
        {HOME}":GOSUB130
XK 1650 POKE198,0:WAIT198,1:GE
        TK$:C=VAL(K$):IFC<1ORC
        >2GOTO1650
FE 1660 GOTO510
HB 1670 FORZ=1TO1500:NEXT:RETU
        RN
```

BEFORE TYPING . . .

Before typing in programs, please refer to "How to Type In COMPUTE!'s Gazette Programs," elsewhere in this issue.

64 Animator

See instructions in article on page 28 before typing in.

Program 1: Boot

```
HC 100 IFA=1THEN130
KP 110 PRINT"{CLR}PLEASE WAIT:
        LOADING ML"
XC 120 A=1:LOAD"ANIMATOR.ML",8
        ,1
KD 130 POKE55,0:POKE56,64:CLR
SD 140 PRINT"{DOWN}CREATING LO
        OK UP TABLES:"
KE 150 PRINT"PLEASE WAIT 17 SE
        CONDS"
BB 160 A=128:B=.5:C=1:D=37019:
        FORX=.TO255
GB 170 Q=INT(SIN(X*↑/A)*A+B)
DM 180 S=SGN(Q):Q=ABS(Q):IFQ>.
        THENQ=Q-C
GC 190 IFS<.THENQ=Q+A
GF 200 POKED+X,Q:NEXT:SYS16384
DM 210 PRINT"{DOWN}ANIMATOR AC
        TIVATED"
XK 220 PRINT"{DOWN}LOAD"CHR$(3
        4)"DEMO"CHR$(34);
KJ 230 PRINT",8,1":PRINT"
        {4 DOWN}RUN{8 UP}"
FX 240 POKE631,13:POKE632,13:P
        OKE198,2
```

Program 2: DEMO

```
MQ 100 A=-60:C=-50:D=60:E=50:F
        =20:G=12
QR 110 H=11:J=-64:K=-55:L=-36:
        M=-35:N=-30
HE 120 P=-20:Q=30:R=19:S=16:T=
        15:U=14:W=13
AG 130 Y=-12:Z=10:CLEAR:FIGURE
        1:REM HOUSE
MP 140 POINT C,A,C,C,Z,C,C,D,0
        ,C,Z,E,C,A,E
EC 150 POINT E,A,E,E,Z,E,E,D,0
        ,E,Z,C,E,A,C
XD 160 POINT K,0,A,K,D,0,K,0,D
        ,55,0,D
AS 170 POINT 55,D,0,55,0,A,-11
        ,A,C,-11,P,C
CD 180 POINT H,P,C,H,A,C,E,M,P
        ,E,P,P
HP 190 POINT E,-5,P,E,-5,0,E,-
        5,F,E,P,F
MB 200 POINT E,M,F,E,M,0
RX 210 POLYG 4,2,2,H,W,G,T,U
DA 220 POLYG 4,2,2,H,S,T,G,H
SG 230 POLYG 5,1,1,H,5,4,3,2,1
DR 240 POLYG 4,1,1,H,6,7,4,5
HD 250 POLYG 5,1,1,H,Z,9,8,7,6
GK 260 POLYG 4,7,2,7,21,23,25,
        27
QG 270 POLYG 2,0,3,5,22,26
GJ 280 POLYG 2,0,3,5,24,28
DB 290 POLYG 4,1,1,H,1,2,9,Z
MA 300 POLYG 4,6,2,7,17,18,R,F
GP 310 POLYG 4,2,2,H,H,G,T,S
BG 320 POLYG 4,2,2,H,U,T,G,W
MX 330 FIGURE2:REM ROAD
BH 340 POINT J,A,J,J,A,63,63,A
        ,63,63,A,J
MX 350 POINT N,A,3,Q,A,3,Q,A,-
        3,N,A,-3
EH 360 POLYG 4,0,3,2,1,2,3,4
AP 370 POLYG 4,1,1,2,5,6,7,8
DM 380 FIGURE3:REM PLANE
HJ 390 POINT D,0,0,-10,N,0,A,N
        ,0,A,Q,0
FR 400 POINT -10,Q,0,A,Q,Q,A,N
        ,Q
BX 410 POLYG 3,0,0,H,5,6,4
CM 420 POLYG 3,0,0,H,3,7,2
CS 430 POLYG 5,0,0,3,5,4,3,2,1
KR 440 POLYG 3,0,0,H,4,6,5
MJ 450 POLYG 3,0,0,H,2,7,3
AB 460 FIGURE4:REM SQUARE
PQ 470 POINT D,A,D,D,D,D,D,D,A
        ,D,A,A
BX 480 POLYG4,1,1,3,1,2,3,4
BA 680 CLR:ERASE:SETCOLOR11,15
        ,0
KG 690 DEF FN R(X)=INT(X*RND(0
        ))
PC 740 FORX=-250TO400STEP5
HB 750 DISPLAY4,64,0,X,0,X,500
        :NEXT:ERASE
DQ 760 FORX=-250TO400STEP5
MA 770 DISPLAY4,0,0,X,X,0,500:
        NEXT:ERASE
PR 780 FORX=-250TO400STEP5
QG 790 DISPLAY4,X,X,0,0,X,500:
        NEXT:ERASE
BE 800 FORX=1000TO0STEP-32
SS 810 DISPLAY4,0,104,0,-300+X
        ,0,2*X+500
QG 820 NEXT:FORX=1000TO0STEP-1
        00
JE 830 DISPLAY1,0,-30,0,-400+X
        ,0,2*X
HC 840 NEXT:FORX=1000TO0STEP-5
        0
JS 850 DISPLAY2,0, 45,0,-200+X
        ,0,2*X
SA 860 NEXT:R=150:W=1/8:CX=80:
        CY=100
RM 870 DIMS(30),C(30):FORX=0TO
        30
AD 880 Q=12*X*↑/180:S(X)=R*SIN
        (Q)
PA 890 C(X)=1.5*R*COS(Q):NEXT
AP 900 DATA 4,9,8,2,10,7,13,3,
        14,6
HA 910 FORX=0TO9:READF(X):NEXT
RH 920 ERASE:SETCOLOR 5,1,0:FO
        RX=0TO29
XP 930 A=S(X):B=C(X):C=S(X+1):
        D=C(X+1)
KQ 940 PAINT 4,F(N),M+1,3,CX+A
        ,CY+B,CX+C,CY+D,CX+C*W,
        CY+D*W,CX+A*W,CY+B*W
ER 950 N=N+1:M=(M+1)AND1:IFN=1
        0THENN=0
QG 960 NEXTX:STAMP:FORX=-250TO
        250STEP5
RX 970 DISPLAY 3,X,0,0,X,-80,4
        00
EJ 980 FLIP:NEXTX:FORX=250TO-4
        00STEP-5
BK 990 DISPLAY 3,-X,0,128,X,80
        ,400
DD 1000 FLIP:NEXTX:LOWRES
```

Program 3: ANIMATOR.ML

```
4000:A9 00 8D B2 40 A9 8C 8D 81
4008:B3 40 A0 27 A9 F8 18 69 C3
4010:08 20 AB 40 88 10 F7 A0 2B
4018:1F A9 00 20 AB 40 88 10 14
4020:FA A0 07 A9 01 20 AB 40 E1
4028:88 10 FA A9 C7 A2 18 A0 84
4030:07 18 69 38 18 69 01 20 73
4038:B1 40 88 10 F7 CA 10 EF AE
4040:A9 FE A2 05 A0 03 18 69 A4
4048:01 18 69 01 20 A8 40 88 39
4050:10 F7 CA 10 EF A9 1E 20 B3
4058:A8 40 A9 D8 18 69 28 20 D6
4060:B1 40 C9 C0 D0 F6 A9 E7 AC
4068:A2 03 18 69 01 BC C1 40 53
4070:20 B1 40 88 10 FA CA 10 10
4078:F1 A2 03 BD BD 40 95 FB EC
4080:CA 10 F8 A2 03 B5 FB 20 BA
4088:B1 40 CA 10 F8 A5 FD 38 DE
4090:E9 08 85 FD 90 0C D0 EB DA
4098:A5 FB C9 FB D0 E5 A9 60 B5
40A0:D0 23 A9 FB 85 FB D0 DB E0
40A8:20 AB 40 20 AE 40 20 B1 96
40B0:40 8D 00 8C EE B2 40 D0 11
40B8:03 EE B3 40 60 FD 91 30 3F
40C0:A0 04 06 05 06 20 B1 40 F7
40C8:A9 01 8D 00 03 A9 41 8D DE
40D0:01 03 20 85 4C A9 15 8D AF
40D8:04 03 A9 41 8D 05 03 A9 95
40E0:D5 8D 06 03 A9 41 8D 07 15
40E8:03 A9 48 8D 08 03 A9 42 19
40F0:8D 09 03 20 1F 4D A2 05 55
40F8:A9 00 9D 00 54 CA 10 FA EA
4100:60 8A 48 30 03 20 0D 41 55
4108:68 AA 4C 8B E3 20 01 4D 9A
4110:A9 00 85 6B 60 A6 7A A0 D1
4118:04 84 0F BD 00 02 10 07 AA
4120:C9 FF F0 3E E8 D0 F4 C9 C7
4128:20 F0 37 85 08 C9 22 F0 D2
4130:56 24 0F 70 2D C9 3F D0 AF
4138:04 A9 99 D0 25 C9 30 90 A8
4140:04 C9 3C 90 1D 84 71 A0 46
4148:00 84 0B 88 86 7A CA C8 52
4150:E8 BD 00 02 38 F9 9E A0 5E
4158:F0 F5 C9 80 D0 30 05 0B 6E
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4F30:88 88 F0 07 20 8F 4F F0 92
4F38:F5 D0 07 88 8C 3C 03 60 2B
4F40:A4 F7 A2 00 88 88 88 88 83
4F48:30 F2 20 8F 4F F0 F5 84 67
4F50:F7 A5 63 85 5F A5 64 85 F8
4F58:60 A5 69 85 61 A5 6A 85 12
4F60:62 20 69 53 A2 03 B5 59 80
4F68:95 6A B5 65 95 5F CA 10 49
4F70:F5 20 69 53 38 A2 FC B5 70
4F78:5D F5 6E 95 5D E8 D0 F7 92
4F80:8D 3C 03 05 5B 05 5A 05 4E
4F88:59 F0 B5 AD 3C 03 60 B9 0A
4F90:64 03 18 F9 60 03 95 63 66
4F98:B9 65 03 F9 61 03 95 64 14
4FA0:B9 66 03 38 F9 62 03 95 8E
4FA8:65 B9 67 03 F9 63 03 95 7E
4FB0:66 15 65 15 64 15 63 60 64
4FB8:20 7C 50 B0 38 20 B2 50 93
4FC0:90 1B 20 D4 50 20 F2 50 F8
4FC8:A9 9F 20 5B 50 20 F6 4F 1E
4FD0:20 D4 50 20 83 50 B0 1D 9C
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4FE0:20 B5 50 90 10 A9 C7 20 E6
4FE8:5B 50 20 F6 4F 20 B2 50 6D
4FF0:B0 03 20 B5 50 60 A2 00 51
4FF8:BD C0 03 9D 60 03 E8 E4 A6
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5008:3F 50 A5 23 38 E9 04 A8 5D
5010:B9 90 03 9D 60 03 E8 B9 86
5018:91 03 9D 60 03 E8 B9 92 BD
5020:03 9D 60 03 E8 B9 93 03 3E
5028:9D 60 03 E8 98 D0 DD 86 E8
5030:FE A2 04 A0 04 20 3F 50 F2
5038:CA CA CA CA 86 02 60 A9 9D
5040:04 85 FD CA 88 BD C0 03 70
5048:D9 90 03 D0 0B C6 FD D0 A7
5050:F2 A5 FE 38 E9 04 85 FE A0
5058:A6 FE 60 85 25 A9 90 85 E6
5060:FB A9 03 85 FC A4 23 20 03
5068:08 52 84 23 A9 C0 85 FB BB
5070:A9 03 85 FC A4 22 20 08 1D
5078:52 84 22 60 A0 00 20 85 78
5080:■■ B0 4D A0 02 98 18 65 31
5088:02 AA 85 FD ■■ 61 03 10 EE
5090:08 CA CA CA CA 10 F5 38 A8
5098:60 A6 FD BD 61 03 30 2F 55
50A0:D0 0B BD 60 03 D9 D1 50 DC
50A8:90 26 CA CA CA CA 10 EB AE
50B0:38 60 A0 ■■ 2C A0 02 98 1A
50B8:18 65 02 AA BD 61 03 D0 F3
50C0:EF ■■ 60 03 D9 D1 50 B0 6C
50C8:07 CA CA CA CA 10 ED 18 30
50D0:60 A0 00 C8 A2 00 ■■ 60 47
50D8:03 A8 BD 62 03 9D 60 03 55
50E0:98 9D 62 03 E8 8A 4A B0 ■■
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50F0:E5 60 A2 03 BD AB 51 95 F5
50F8:57 CA 10 F8 A6 02 86 5B 2F
5100:86 5C ■■ 62 03 C5 57 BD 76
5108:63 03 E5 58 50 01 6A 10 CA
5110:0C BD 62 03 85 57 BD 63 0D
5118:03 85 58 86 5B BD 62 03 AA
5120:C5 59 BD 63 03 E5 5A 50 9E
5128:01 6A 30 0C BD 62 03 85 AF
5130:59 BD 63 03 85 5A 86 5C 8A
5138:CA CA CA CA 10 C4 A6 5B 35
5140:A0 00 BD 60 03 99 90 03 93
5148:BD 61 03 99 91 03 BD 62 92
5150:03 99 92 03 BD 63 03 99 78
5158:93 03 E4 5C F0 0E C8 C8 02
5160:C8 C8 CA CA CA CA 10 DA 1C
5168:A6 02 D0 D6 C8 C8 C8 C8 2A
5170:84 23 A6 5B A0 00 BD 60 89
5178:03 99 C0 03 BD 61 03 99 5E
5180:C1 03 BD 62 03 99 C2 03 A9
5188:BD 63 03 99 C3 03 E4 5C 2D
5190:F0 12 C8 C8 C8 C8 E8 E8 F9
5198:E8 E8 E4 02 90 D8 F0 D6 47
51A0:A2 ■■ F0 D2 C8 C8 C8 C8 A3
51A8:84 22 60 FF 7F 00 80 AD CC
51B0:66 03 CD 62 03 AD 67 03 C7
51B8:ED 63 03 10 13 A2 03 BD 73
51C0:60 03 A8 BD 64 03 9D 60 10
51C8:03 98 9D 64 03 CA 10 EF 60
51D0:60 A9 04 85 02 A9 60 85 E3
51D8:FB A9 03 85 FC 20 7C 50 4E
51E0:B0 C8 20 B2 50 90 13 20 48
51E8:D4 50 20 AF 51 A9 9F 20 99
51F0:04 52 20 D4 50 20 83 50 D5
51F8:B0 B0 20 B5 50 90 AB 20 BB
5200:AF 51 A9 C7 85 25 A0 08 8C
5208:84 24 A0 03 B1 FB 10 3B 15
5210:A0 07 B1 FB 10 2C C8 C8 48
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5220:E9 07 85 FD A5 24 E5 FD 93
5228:85 24 A5 ■■ 18 65 FD 85 E4
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5240:D0 F7 A2 00 A0 00 84 FD AB
5248:20 82 52 A4 24 88 B1 FB D4
5250:D0 0A 88 B1 FB C5 25 90 DD
5258:25 F0 23 C8 88 88 88 88 BC
5260:B1 FB D0 F8 88 B1 FB C5 4F
5268:25 F0 02 B0 F0 88 88 98 7A
5270:18 69 08 85 24 E9 03 85 29
5278:FD A6 25 20 82 52 A4 24 17
5280:18 60 86 26 A2 00 B1 FB F0
5288:95 57 C8 E8 E0 08 D0 F6 35
5290:A2 02 B5 5B 38 F5 57 95 51
5298:61 B5 5C F5 58 95 62 CA EE
52A0:CA F0 EF A5 26 38 E5 59 76
52A8:85 5F A9 00 E5 5A 85 60 21
52B0:20 CE 52 A4 FD A5 5F 18 0B
52B8:65 57 91 FB C8 A5 60 65 DA
52C0:58 91 FB C8 A5 26 91 FB E6
52C8:C8 A9 00 91 FB 60 A2 04 FF
52D0:20 87 53 A0 10 A9 00 85 88
52D8:5F 85 60 A5 63 05 64 F0 DD
52E0:0B A5 59 05 5A 05 5B 05 92
52E8:5C D0 16 ■■ 4C 8A BB A2 5F
52F0:02 B5 59 95 5A CA 10 F9 A0
52F8:A9 00 85 59 98 38 E9 08 3A
5300:A8 A5 5C F0 EA 24 5C 30 CF
5308:0B 88 06 59 26 5A 26 5B EE
5310:26 5C 10 F5 C8 06 63 26 8D
5318:64 10 F9 46 5C 66 5B 66 32
5320:5A 66 59 46 64 66 63 98 39
5328:30 3B A5 5B 38 E5 63 AA EA
5330:A5 5C E5 64 90 04 85 5C BF
5338:86 5B 26 5F 26 60 B0 26 ED
5340:06 59 26 5A 26 5B 26 5C F1
5348:88 10 DF 24 5D 10 16 A2 6F
5350:00 A5 ■■ 49 FF 95 60 B5 CD
5358:5F 49 FF 95 5F F6 5F D0 C0
5360:02 F6 60 06 5D 60 4C 7E B5
5368:B9 A2 02 20 87 53 24 5D 06
5370:10 14 A2 03 B5 59 49 FF 4E
5378:95 59 CA 10 F7 E8 E0 04 C3
5380:F0 ■■ F6 59 F0 F7 60 A9 E6
5388:55 85 5D B5 60 10 03 20 AB
5390:53 53 CA CA 10 F5 A9 00 67
5398:85 59 85 5A 85 5B 85 5C AF
53A0:A2 0F 06 59 26 5A 26 5B F4
53A8:26 5C 06 5F 26 60 90 15 19
53B0:A5 59 18 65 61 85 59 A5 53
53B8:5A 65 62 85 5A 90 06 E6 92
53C0:5B D0 02 E6 5C CA 10 DA 01
53C8:60 00 00 00 00 00 00 00 9F
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BEFORE TYPING . . .

Before typing in programs, please refer to " How to Type In COMPUTE!'s Gazette Programs," elsewhere in this issue.

The GEOS Column

Program 1: SlideShow

See instructions in article on page 68 before typing in.

```
1503:BF FF FF FF 80 00 01 BF D2
150B:FF FD A0 00 05 AF FF F5 A5
1513:A8 00 15 A8 18 95 A9 18 41
151B:15 AB 00 15 A8 00 15 A8 24
1523:70 15 A8 DB 95 AB 8E D5 EB
152B:AF 80 75 A8 00 15 AF FF 3A
1533:F5 A0 00 05 BF FF FD 80 4B
153B:00 01 80 00 01 FF FF FF BD
1543:81 06 00 00 04 FF 03 00 D6
154B:04 53 6C 69 64 65 53 68 38
1553:6F 77 20 20 20 56 31 2E 04
155B:30 00 00 00 00 4A 6F 68 0E
1563:6E 20 50 2E 20 53 74 61 52
156B:62 69 6C 65 20 20 20 20 E6
1573:00 00 00 00 00 00 00 00 9D
157B:00 00 00 00 00 00 00 00 A5
1583:00 00 00 00 00 00 00 00 AD
158B:00 00 00 00 00 00 00 00 B5
1593:00 00 ■■ 00 00 00 00 00 BD
159B:00 00 00 00 55 73 65 20 29
15A3:74 68 65 20 73 6C 69 64 55
15AB:65 20 73 68 6F 77 20 70 8F
15B3:72 6F 67 72 61 6D 20 74 7C
15BB:6F 20 64 69 73 70 6C 61 60
15C3:79 20 47 45 4F 53 20 50 48
15CB:61 69 6E 74 20 49 6D 61 78
15D3:67 65 73 2E 00 00 00 00 5C
15DB:00 00 00 00 00 00 00 00 06
15E3:00 00 00 00 00 00 00 00 0E
15EB:00 00 00 00 00 00 00 00 16
15F3:00 00 00 00 00 00 00 00 1E
15FB:00 00 ■■ 00 20 10 04 20 8F
1603:3D 04 20 29 05 20 96 05 40
160B:20 1D 0E 60 A9 04 8D AA 79
1613:84 A9 56 8D A9 84 A9 C0 03
161B:85 2F 20 8A C1 A5 02 C9 F4
1623:00 F0 15 A9 13 85 05 A9 2B
162B:6C 85 04 A2 08 A0 04 20 84
1633:65 C2 20 29 05 4C 0D 08 D4
163B:60 A9 04 85 03 A9 57 85 CD
1643:02 20 36 C1 A9 04 85 03 C6
164B:A9 62 85 02 A9 00 20 51 94
1653:C1 60 60 05 00 01 00 ■■ D8
165B:00 03 3F 01 C7 00 00 0E 8C
1663:00 00 76 00 44 BF 04 ■■ 08
166B:7D 04 C4 04 80 89 04 08 6A
1673:05 80 A9 04 24 05 00 BE AB
167B:07 0F 1E 00 00 4F 00 C1 B1
1683:C9 04 00 29 05 0F 5F 1D 68
168B:■■ 69 00 C5 D8 04 00 96 DB
1693:05 E3 04 00 90 0D EE 04 56
169B:■■ DC 0D FD 04 ■■ 58 06 57
16A3:DE 04 00 52 06 0F 3C 32 7C
16AB:00 5B 00 C3 10 05 00 C5 45
16B3:0F 18 05 00 60 ■■ 1F 05 78
16BB:00 51 0B 67 65 6F 73 00 E3
16C3:66 69 6C 65 ■■ 53 6C 69 F0
16CB:64 65 53 68 6F 77 20 69 77
16D3:6E 66 6F 00 61 6C 62 75 B5
16DB:6D 00 71 75 69 74 00 6E CF
16E3:65 78 74 20 73 63 72 61 E0
16EB:70 00 70 72 65 76 69 6F CC
16F3:75 73 20 73 63 72 61 70 0B
16FB:00 73 61 76 65 20 73 6C 97
1703:69 64 65 00 6F 70 74 69 3B
170B:6F 6E 73 00 64 69 73 70 1B
1713:6C 61 79 00 62 6F 72 64 19
171B:65 72 00 66 61 64 65 00 66
1723:73 68 6F 77 00 20 BD C1 48
172B:A9 05 85 03 A9 38 85 02 8B
1733:20 56 C2 60 81 01 11 48 DF
173B:0B 15 10 51 05 0B 15 20 E9
1743:5F 05 0B 15 30 70 05 0B 6D
174B:15 40 80 05 00 18 19 20 27
1753:20 20 20 20 20 20 20 20 81
175B:20 1B 00 18 19 53 6C 69 3A
1763:64 65 53 68 6F 77 20 20 C7
176B:20 20 1B 00 18 19 20 20 9A
1773:20 20 20 20 20 20 20 20 A1
177B:20 20 1B ■■ 18 19 43 6F 40
1783:70 79 72 69 67 68 74 20 13
178B:31 39 38 39 20 20 20 20 1D
1793:1B 00 20 BD C1 A9 07 85 77
179B:10 A9 13 85 0F A9 5B 85 52
17A3:0E A9 13 85 17 A9 7D 85 DD
17AB:16 A9 01 85 11 20 3B C2 0A
17B3:A5 11 C9 00 F0 03 4C BE 1D
17BB:07 A9 05 85 03 A9 ED 85 F0
17C3:02 A9 07 85 10 A9 13 85 69
17CB:0D A9 5B 85 0C A9 13 85 61
17D3:17 A9 7D 85 16 20 56 C2 A0
17DB:A5 02 C9 05 F0 04 4C BE D5
17E3:07 60 20 5E 0D 20 1D 0E C8
17EB:60 81 0B 82 0A 16 06 0B F3
17F3:82 13 21 06 0B 82 1C 2C 73
17FB:06 0B 82 38 36 06 0B 82 26
1803:53 3F 06 0B 82 5C 48 06 3A
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1813:3B 00 20 20 43 68 6F 6F F0
181B:73 65 20 1B 00 20 20 20 F4
1823:61 6C 62 75 6D 20 1B 00 E4
182B:20 20 20 20 61 6E 64 20 27
1833:1B 00 20 20 20 20 6F 72 C9
183B:20 1B 00 20 20 20 20 74 7A
1843:6F 20 1B 00 20 20 20 53 AB
184B:68 6F 77 20 1B 00 20 BD 53
1853:C1 4C 2C C2 20 BD C1 AD 52
185B:E3 06 C9 00 F0 30 A9 06 D9
1863:85 03 A9 E4 85 02 20 38 47
186B:C2 A9 06 85 15 A9 EB 85 2D
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1873:14 A9 00 85 16 20 ED C1 3F
187B:A9 06 85 03 A9 E4 85 02 D0
1883:20 74 C2 20 89 C2 20 77 4A
188B:C2 A9 00 8D E3 06 A9 06 F0
1893:85 03 A9 E4 85 02 20 74 B3
189B:C2 AD BC 07 20 80 C2 20 49
18A3:86 C2 AD 97 13 85 07 AD 61
18AB:96 13 85 06 A9 13 8D E2 94
18B3:06 A9 ?? 8D E1 06 A5 06 B4
18BB:38 ED E1 06 85 06 A5 07 B6
18C3:ED E2 06 85 07 A9 13 85 47
18CB:11 A9 90 85 10 20 8F C2 3C
18D3:20 7A C2 AD 96 84 8D BC 84
18DB:07 20 77 C2 60 00 00 01 B6
18E3:53 6C 69 64 65 73 00 E4 2A
18EB:06 03 15 BF FF FF FF ?? FE
18F3:00 01 BF FF FD A0 00 05 D3
18FB:A0 00 05 A0 00 05 A0 00 7C
1903:05 A0 00 05 A0 00 05 A0 DF
190B:00 05 A0 00 05 A0 00 05 42
1913:A0 00 05 A0 00 05 A0 00 95
191B:05 A0 00 05 A0 00 05 A0 F7
1923:00 05 BF FF FD 80 00 01 B1
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1933:FF FF 00 00 53 6C 69 64 E8
193B:65 73 20 20 20 20 20 20 E4
1943:56 31 2E 30 00 00 00 00 B5
194B:4A 6F 68 6E 20 50 2E 20 31
1953:53 74 61 62 69 6C 65 20 86
195B:20 20 20 00 53 6C 69 64 2D
1963:65 53 68 6F 77 20 20 20 BD
196B:56 31 2E 30 00 00 ?? 00 DD
1973:00 00 00 00 00 00 ?? 00 A5
197B:00 00 00 00 00 00 ?? 00 AD
1983:00 00 00 00 55 73 65 20 19
198B:74 68 65 20 73 6C 69 64 45
1993:65 20 73 68 6F 77 20 70 7F
199B:72 6F 67 72 61 6D 20 74 6C
19A3:6F 20 64 69 73 70 6C 61 50
19AB:79 20 74 68 65 73 65 20 9B
19B3:73 6C 69 64 65 73 2E 00 83
19BB:00 00 20 BD C1 A9 07 85 16
19C3:10 A9 13 85 0F A9 6C 85 A0
19CB:0E A9 13 85 17 A9 89 85 22
19D3:16 A9 01 85 11 20 3B C2 36
19DB:A5 11 C9 00 F0 03 20 C6 F8
19E3:08 A9 08 85 03 A9 5D 85 DC
19EB:02 A9 07 85 10 A9 13 85 95
19F3:0D A9 6C 85 0C A9 13 85 AF
19FB:17 A9 89 85 16 20 56 C2 4E
1A03:A5 02 C9 05 F0 03 4C 2C 6C
1A0B:C2 20 BA C1 A9 13 85 03 BD
1A13:A9 6C 85 02 20 74 C2 A9 0A
1A1B:00 20 80 C2 A9 0F 85 07 2F
1A23:A9 A0 85 06 A9 13 85 11 1B
1A2B:A9 90 85 10 20 8C C2 20 E2
1A33:D2 0F 20 7A C2 E0 00 F0 CA
1A3B:03 4C 56 08 A9 0F 85 07 EA
1A43:A9 A0 85 06 A9 13 85 11 3B
1A4B:A9 90 85 10 20 8C C2 4C 2F
1A53:33 08 20 77 C2 4C 2C C2 01
1A5B:60 81 0B 82 0A 86 ?? 0B 2F
1A63:82 13 91 08 0B 82 1C 9D 88
1A6B:08 0B 82 38 A7 ?? ?? 82 30
1A73:53 B2 08 0B 82 5C BC 08 B6
1A7B:10 04 04 05 11 20 02 11 A7
1A83:3B 00 20 20 43 68 6F 6F 65
1A8B:73 65 20 1B ?? 20 20 20 69
1A93:53 6C 69 64 65 73 20 1B 54
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1AA3:20 1B 00 20 20 20 20 20 92
1AAB:6F 72 20 20 1B 00 20 20 73
1AB3:20 20 20 74 6F 20 1B 00 7D
1ABB:20 20 20 20 65 78 69 74 62
1AC3:1B 00 20 BD C1 A9 08 85 AF
1ACB:03 A9 D8 85 02 ?? 56 C2 5F
1AD3:4C 2C C2 60 81 01 11 48 12
1ADB:0B 10 10 F1 08 0B 10 20 67
1AE3:06 09 0B 10 30 1B 09 0B CA
1AEB:10 40 3B 09 00 4E 6F 20 68
1AF3:53 6C 69 64 65 53 68 6F 19
1AFB:77 20 66 69 6C 65 73 20 57
1B03:1B 00 65 78 69 73 74 20 1D
1B0B:6F 6E 20 74 ?? 69 73 20 CF
1B13:64 69 73 6B 2E 1B 00 43 1C
1B1B:6F 70 79 20 6F 6E 65 20 76
1B23:6F 72 20 6D 6F 72 65 20 B8
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1B4B:1B 20 74 6F 20 63 72 65 75
1B53:61 74 65 20 6F 6E 65 2E 34
1B5B:1B 00 59 4E 20 BD C1 A9 54
1B63:0A 85 03 A9 20 85 02 20 36
1B6B:56 C2 A5 02 C9 03 F0 09 97
1B73:A5 02 C9 04 F0 0C 4C 1C E2
1B7B:0A AD 5E 09 8D 90 13 4C 9F
1B83:8F 09 AD 5F 09 8D 90 13 22
1B8B:4C 1C 0A A9 0A 85 03 A9 E0
1B93:30 85 02 20 56 C2 A5 02 90
1B9B:C9 01 F0 1E A5 02 C9 02 C1
1BA3:F0 18 AD 91 13 18 69 01 F3
1BAB:8D 91 13 AD 91 13 C9 0F C5
1BB3:30 D9 A9 00 8D 91 13 4C D2
1BBB:8F 09 A9 0A 85 03 A9 71 CE
1BC3:85 02 20 56 C2 A5 02 C9 21
1BCB:01 F0 1E A5 02 C9 02 F0 09
1BD3:18 AD 92 13 18 69 01 8D FA
1BDB:92 13 AD 92 13 C9 0F 30 0D
1BE3:D9 A9 00 8D 92 13 4C BE 82
1BEB:09 A9 0A 85 03 A9 B9 85 62
1BF3:02 20 56 C2 A5 02 C9 01 F3
1BFB:F0 1E A5 02 C9 02 F0 18 57
1C03:AD 94 13 18 69 01 8D 94 1A
1C0B:13 AD 94 13 C9 1F 30 D9 01
1C13:A9 00 8D 94 13 4C ED 09 C9
1C1B:20 1D 0E 60 81 04 02 48 DA
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1C2B:02 11 48 ?? 81 01 02 48 0E
1C33:0B 10 18 F3 0A 03 0A 48 EF
1C3B:02 11 48 13 43 0A 00 A9 DE
1C43:01 20 39 C1 A9 46 85 06 BE
1C4B:A9 46 85 07 18 AD 91 13 B8
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1C5B:A9 78 85 08 A9 00 85 ?? 1B
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1C6B:FF 20 27 C1 60 81 01 02 B9
1C73:48 0B 10 18 ?? ?? 03 0A C2
1C7B:48 02 11 48 13 84 0A 00 BD
1C83:A9 01 20 39 C1 A9 46 85 2F
1C8B:06 A9 5A 85 07 A9 00 85 39
1C93:09 A9 64 85 08 A9 00 85 0C
1C9B:0B A9 64 85 0A AD 92 13 E7
1CA3:18 65 0A 85 0A AD 93 13 1C
1CAB:65 0B 85 0B 20 24 C1 A9 79
1CB3:FF 20 27 C1 60 81 01 02 02
1CBB:48 0B 10 18 27 0B 02 11 D8
1CC3:48 03 0A 48 13 CC 0A 00 86
1CCB:AD 94 13 20 39 C1 A9 46 CE
1CD3:85 06 A9 5A 85 07 A9 00 C6
1CDB:85 09 A9 8C ?? 08 A9 00 B6
1CE3:85 0B A9 B4 85 0A 20 24 DA
1CEB:C1 A9 FF 20 27 C1 60 18 8A
1CF3:49 6E 63 72 65 61 73 65 FC
1CFB:20 42 6F 72 64 65 72 20 A7
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1D2B:67 65 20 50 61 74 74 65 A6
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1D3B:20 59 6F 75 20 57 61 6E B0
1D43:74 20 61 20 42 6F 72 64 07
1D4B:65 72 3F 1B ?? 20 BD C1 2C
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1D5B:20 56 C2 20 1D 0E 60 81 F8
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1D6B:C1 0C 0B 12 2C D9 0C 0B F7
1D73:12 36 FA 0C 0B 12 40 1A 9F
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1D8B:85 02 20 5A C1 60 05 A0 EC
1D93:00 78 EB 0B 0C 6E 03 10 4A
1D9B:BE ?? 10 0C 0F 6E 03 10 03
1DA3:C7 0B 35 0C 12 6E 03 10 4C
1DAB:D0 0B 5A 0C 15 6E 03 10 95
1DB3:D9 0B 7F 0C 18 6E 03 10 DE
1DBB:E2 0B A9 00 8D 95 13 4C 94
1DC3:BF C2 60 A9 01 8D 95 13 B1
1DCB:4C BF C2 60 A9 02 8D 95 B0
1DD3:13 4C BF C2 60 A9 03 8D 0C
1DDB:95 13 4C BF C2 60 A9 04 1A
1DE3:8D 95 13 4C BF C2 60 0C 47
1DEB:00 9E 0F FF F0 08 00 10 67
1DF3:08 42 10 08 62 10 08 52 FA
1DFB:10 08 5A 10 08 4A 10 08 1E
1E03:46 10 08 ?? 10 0F FF F0 15
1E0B:06 00 06 61 0C 00 9E 0F CD
1E13:FF F0 08 00 10 08 78 10 2E
1E1B:08 48 10 08 78 10 08 50 54
1E23:10 08 48 10 08 44 10 ?? EC
1E2B:00 10 0F FF F0 06 ?? 06 F2
1E33:61 0C 00 9E 0F FF F0 08 6F
1E3B:00 10 08 60 10 08 60 10 F3
1E43:08 ?? 10 08 60 10 08 60 D1
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1E53:FF F0 06 00 06 61 0C 00 5A
1E5B:9E 0F FF F0 08 00 10 08 22
1E63:42 10 08 42 10 08 42 10 1F
1E6B:08 42 10 08 42 10 08 7E 9F
1E73:10 08 00 10 0F FF F0 06 1B
1E7B:00 ?? 61 0C 00 9E 0F FF BE
1E83:F0 08 00 10 08 7E 10 08 9D
1E8B:42 10 08 40 10 08 40 10 23
1E93:08 42 10 08 7E 10 08 00 2B
1E9B:10 0F FF F0 06 ?? 06 61 50
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1EAB:63 68 6F 6F 73 65 20 66 70
1EB3:61 64 65 20 6D 65 74 68 BA
1EBB:6F 64 20 1B 00 50 69 63 F5
1EC3:6B 18 20 28 4E 29 1B 20 AF
1ECB:66 6F 72 20 4E 6F 72 6D E9
1ED3:61 6C 20 1B 00 50 69 63 09
1EDB:6B 18 20 ?? 52 29 1B 20 E7
1EE3:66 6F 72 20 46 61 64 65 65
1EEB:20 74 6F 20 52 69 67 68 B4
1EF3:74 20 20 20 1B 00 50 69 5B
1EFB:63 6B 18 20 28 4C 29 1B A9
1F03:20 66 6F 72 20 46 61 64 41
1F0B:65 20 74 6F 20 4C 65 66 EC
1F13:74 20 20 20 1B 00 50 69 7C
1F1B:63 6B 18 20 28 55 29 1B EE
1F23:20 66 6F 72 20 46 61 64 61
1F2B:65 20 66 72 6F 6D 20 42 CB
1F33:6F 74 74 6F 6D 20 1B 00 ED
1F3B:50 69 63 6B 18 20 28 43 F3
1F43:29 1B 20 ?? 6F 72 20 46 13
1F4B:61 64 65 20 66 72 6F 6D 4B
1F53:20 43 65 6E 74 65 72 20 44
1F5B:1B 00 A9 13 85 03 A9 5B 74
1F63:85 02 20 74 C2 AD BD 07 7F
1F6B:20 80 C2 A9 0F 85 07 A9 13
1F73:A0 85 ?? A9 13 85 11 A9 39
1F7B:FC 85 10 20 8C C2 A5 11 69
1F83:8D 97 13 A5 10 8D 96 13 22
1F8B:20 77 C2 60 20 BD C1 A9 3B
1F93:13 85 03 A9 5B 85 02 20 CC
1F9B:74 C2 AD BD 07 20 ?? C2 D2
1FA3:20 7A C2 AD 97 84 3B E9 EC
1FAB:01 CD 96 84 F0 3E A9 0F DB
1FB3:85 07 A9 A0 85 06 A9 13 60
1FBB:85 11 A9 FC 85 10 20 8C 3F
1FC3:C2 A5 11 8D 97 13 A5 10 2C
1FCB:8D 96 13 AD 96 84 8D ?? 53
1FD3:07 20 77 C2 20 1D 0E 60 AA
1FDB:20 BD C1 A9 13 85 03 A9 CA
1FE3:5B 85 02 20 74 C2 AD BD 3B
1FEB:07 20 80 C2 20 7D C2 A9 1B
1FF3:0F 85 07 A9 A0 85 06 A9 67
1FFB:13 85 11 A9 FC 85 10 20 20
2003:8C C2 A5 11 8D 97 13 A5 96
200B:10 8D 96 13 AD 96 84 8D 19
2013:BD 07 20 77 C2 20 1D 0E 4E
201B:60 A9 00 ?? 39 C1 A9 14 30
2023:85 06 A9 C7 85 07 A9 00 F4
202B:85 09 A9 00 85 08 A9 01 46
2033:85 0B A9 3F 85 0A 20 24 DA
203B:C1 A9 13 85 03 A9 FF 85 C5
2043:02 A9 28 8D 59 13 38 AD 02
204B:59 13 ED FC 13 8D 59 13 1F
2053:A9 00 85 05 AD 59 13 85 E7
205B:04 A2 04 A9 00 85 07 A9 2F
2063:02 85 06 A0 06 20 69 C1 16
```

```
206B:A5 04 8D 59 13 A9 C8 8D 25
2073:5A 13 38 AD 5A 13 ED FD 80
207B:13 8D 5A 13 A9 00 85 05 82
2083:AD 5A 13 85 04 A2 04 A9 48
208B:00 85 07 A9 02 85 06 A0 7B
2093:06 20 69 C1 A5 04 8D 5A DA
209B:13 AD 59 13 85 04 AD 5A 1F
20A3:13 85 05 AD FC 13 85 06 8F
20AB:AD FD 13 85 07 20 42 C1 FB
20B3:A9 0F 85 03 A9 B7 85 02 A6
20BB:A9 0A 85 05 A9 00 85 19 C5
20C3:A9 8C 85 18 20 48 C1 A9 7D
20CB:0F 85 03 A9 BF 85 02 A9 B1
20D3:0A 85 05 A9 00 85 19 A9 A7
20DB:CD 85 18 20 48 C1 AD 90 9E
20E3:13 CD 5F 09 F0 26 AD 94 AD
20EB:13 20 39 C1 A9 00 85 06 5F
20F3:A9 0F 85 07 A9 00 85 09 4F
20FB:A9 B4 85 08 A9 00 85 0B D2
2103:A9 C3 85 0A 20 24 C1 A9 1B
210B:FF 20 27 C1 AD 95 13 C9 0A
2113:01 F0 30 AD 95 13 C9 02 81
211B:F0 44 AD 95 13 C9 03 F0 AC
2123:58 AD 95 13 C9 04 F0 6C 8D
212B:A9 0B 85 03 A9 EB 85 02 EF
2133:A9 1E 85 04 A9 00 85 05 20
213B:A9 03 85 06 A9 10 85 07 C3
2143:4C B3 0F A9 0C 85 03 A9 3B
214B:10 85 02 A9 1E 85 04 A9 BA
2153:00 85 05 A9 03 85 06 A9 16
215B:10 85 07 4C B3 0F A9 0C E5
2163:85 03 A9 35 85 02 A9 1F 57
216B:85 04 A9 00 85 05 A9 03 3D
2173:85 06 A9 10 85 07 4C B3 C4
217B:0F A9 0C 85 03 A9 5A 85 82
2183:02 A9 1E 85 04 A9 00 85 99
218B:05 A9 03 85 06 A9 10 85 EF
2193:07 4C B3 0F A9 0C 85 03 5F
219B:A9 7F 85 02 A9 1E 85 04 38
21A3:A9 00 85 05 A9 03 85 06 26
21AB:A9 10 85 07 4C B3 0F 20 57
21B3:42 C1 60 42 6F 72 64 65 2B
21BB:72 3A 00 46 61 64 65 3A CB
21C3:00 20 BD C1 20 D2 0F 20 6C
21CB:3D 04 20 1D 0E 60 A9 40 09
21D3:85 2F A9 13 85 03 A9 4E E4
21DB:85 02 20 36 C1 AD 94 13 C9
21E3:20 39 C1 A9 28 8D 59 13 94
21EB:38 AD 59 13 ED FC 13 8D 29
21F3:59 13 A9 00 85 05 AD 59 D1
21FB:13 85 04 A2 04 A9 00 85 20
2203:07 A9 02 85 06 A0 06 20 AC
220B:69 C1 A5 04 8D 59 13 A9 0B
2213:C8 8D 5A 13 38 AD 5A 13 DB
221B:ED FD 13 8D 5A 13 A9 00 83
2223:85 05 AD 5A 13 85 04 A2 20
222B:04 A9 00 85 07 A9 02 85 9C
2233:06 A0 06 20 69 C1 A5 04 07
223B:8D 5A 13 AD 90 13 CD 5F E5
2243:09 F0 03 20 8B 10 A9 13 AD
224B:85 03 A9 FF 85 02 AD 59 31
2253:13 85 04 AD 5A 13 85 05 0D
225B:AD FC 13 85 06 AD FD 13 66
2263:85 07 20 42 C1 20 60 11 B4
226B:A9 C0 85 2F A9 00 85 19 C9
2273:A9 00 85 18 A4 00 20 4E 72
227B:C1 20 8A C1 AD 05 85 C9 6C
2283:00 10 03 4C 80 10 60 AD A3
228B:5A 13 8D 48 13 38 AD 48 15
2293:13 ED 91 13 8D 48 13 AD A1
229B:59 13 85 04 A2 04 A9 08 C2
22A3:85 06 A0 06 20 60 C1 A5 4C
22AB:04 8D 47 13 A5 05 8D 4A 16
22B3:13 A5 04 8D 49 13 38 AD F8
22BB:47 13 ED 92 13 8D 47 13 BF
22C3:AD 91 13 8D 4B 13 18 AD 03
22CB:FD 13 6D 4B 13 8D 4B 13 AE
22D3:18 AD 5A 13 6D 4B 13 8D 58
22DB:4B 13 AD 92 13 18 6D 49 86
22E3:13 8D 49 13 AD 93 13 6D BE
22EB:4A 13 8D 4A 13 AD FC 13 CC
22F3:85 04 A2 04 A9 08 85 06 0F
22FB:A0 06 20 60 C1 A5 05 8D 58
2303:4D 13 A5 04 8D 4C 13 AD 1B
230B:4C 13 18 6D 49 13 8D 49 11
2313:13 AD 4D 13 6D 4A 13 8D 71
231B:4A 13 A9 00 85 07 A9 00 1C
2323:85 06 A9 00 85 08 A9 00 82
232B:85 07 A9 00 85 09 A9 00 CE
2333:85 08 A9 00 85 0B A9 00 1F
233B:85 0A AD 48 13 85 06 AD 69
2343:4B 13 85 07 AD 47 13 85 4B
234B:08 AD 4A 13 85 0B AD 49 78
2353:13 85 0A 20 24 C1 A9 FF 43
235B:20 27 C1 60 AD 95 13 C9 6D
2363:00 F0 25 AD 95 13 C9 01 F2
236B:F0 3C AD 95 13 C9 02 D0 DC
2373:03 4C 0A 12 AD 95 13 C9 64
237B:03 D0 03 4C 6A 12 AD 95 29
2383:13 C9 04 D0 03 4C C3 12 36
238B:A9 00 85 06 A9 C7 85 07 36
2393:A9 00 85 09 A9 00 85 08 50
239B:A9 01 85 0B A9 3F 85 0A B7
23A3:20 2D C1 4C 42 13 A9 01 F4
23AB:8D 43 13 A9 00 85 06 A9 52
23B3:C7 85 07 A9 00 85 09 A9 8C
23BB:00 85 08 A9 00 85 0B A9 D4
23C3:02 85 0A 20 2D C1 AD 45 C0
23CB:13 18 65 0A 85 0A AD 46 E4
23D3:13 65 0B 85 0B AD 43 13 5F
23DB:18 69 01 8D 43 13 AD 43 86
23E3:13 C9 32 F0 03 4C C7 11 65
23EB:A9 00 85 06 A9 C7 85 07 96
23F3:A9 00 85 09 A9 00 85 08 B0
23FB:A9 01 85 0B A9 3F 85 0A 18
2403:20 2D C1 4C 42 13 A9 01 56
240B:8D 43 13 A9 00 85 06 A9 B3
2413:C7 85 07 A9 01 85 09 A9 F5
241B:3D 85 08 A9 01 85 0B A9 DC
2423:3F 85 0A 20 2D C1 A5 08 73
242B:38 ED 45 13 85 08 A5 09 85
2433:ED 46 13 85 09 AD 43 13 57
243B:18 69 01 8D 43 13 AD 43 E7
2443:13 C9 32 F0 03 4C 27 12 86
244B:A9 00 85 06 A9 C7 85 07 F7
2453:A9 00 85 09 A9 00 85 08 12
245B:A9 01 85 0B A9 3F 85 0A 79
2463:20 2D C1 4C 42 13 A9 01 B6
246B:8D 43 13 A9 C5 85 06 A9 42
2473:C7 85 07 A9 00 85 09 A9 4E
247B:00 85 08 A9 01 85 0B A9 9E
2483:3F 85 0A 20 2D C1 38 A5 96
248B:06 ED 44 13 85 06 AD 43 EE
2493:13 18 69 01 8D 43 13 AD F5
249B:43 13 C9 2D F0 03 4C 87 0A
24A3:12 A9 00 85 06 A9 C7 85 A3
24AB:07 A9 00 85 09 A9 00 85 AE
24B3:08 A9 01 85 0B A9 3F 85 E5
24BB:0A 20 2D C1 4C 42 13 A9 0E
24C3:01 8D 43 13 A9 63 85 06 75
24CB:A9 65 85 07 A9 00 85 09 C4
24D3:A9 9F 85 08 A9 00 85 0B 6D
24DB:A9 A1 85 0A 20 2D C1 38 24
24E3:A5 06 ED 44 13 85 06 18 55
24EB:AD 44 13 65 07 85 07 A5 D6
24F3:08 38 ED 45 13 85 08 A5 C4
24FB:09 ED 46 13 85 09 AD 45 2F
2503:13 18 65 0A 85 0A AD 46 20
250B:13 65 0B 85 0B AD 43 13 9A
2513:18 69 01 8D 43 13 AD 43 C1
251B:13 C9 16 F0 03 4C E0 12 50
2523:A9 00 85 06 A9 C7 85 07 D1
252B:A9 00 85 09 A9 00 85 08 EB
2533:A9 01 85 0B A9 3F 85 0A 53
253B:20 2D C1 4C 42 13 60 00 FC
2543:04 06 00 00 00 00 00 00 11
254B:00 00 05 00 01 00 00 00 3E
2553:03 3F 01 C7 00 00 00 20 AB
255B:20 20 20 20 20 20 20 20 A5
2563:20 20 20 20 20 20 20 00 8D
256B:20 20 20 20 20 20 20 20 B5
2573:20 20 20 20 20 20 20 20 BD
257B:00 70 68 6F 74 6F 20 61 E8
2583:6C 62 75 6D 00 53 6C 69 B1
258B:64 65 73 00 4E 09 09 00 78
2593:01 00 00 00 00 00 00 00 5E
259B:00 00 00 00 00 00 00 00 E5
25A3:00 00 00 00 00 00 00 00 ED
25AB:00 00 00 00 00 00 00 00 F5
25B3:00 00 00 00 00 00 00 00 FD
25BB:00 00 00 00 00 00 00 00 06
25C3:00 00 00 00 00 00 00 00 0E
25CB:00 00 00 00 00 00 00 00 16
25D3:00 00 00 00 00 00 00 00 1E
25DB:00 00 00 00 00 00 00 00 26
25E3:00 00 00 00 00 00 00 00 2E
25EB:00 00 00 00 00 00 00 00 36
25F3:00 00 00 00 00 00 00 00 3E
25FB:00 00 00 00 00 00 00 00 46
2603:00 00 00 00 00 00 00 00 4F
260B:00 00 00 00 00 00 00 00 57
2613:00 00 00 00 00 00 00 00 5F
261B:00 00 00 00 00 00 00 00 67
2623:00 00 00 00 00 00 00 00 6F
262B:00 00 00 00 00 00 00 00 77
2633:00 00 00 00 00 00 00 00 7F
263B:00 00 00 00 00 00 00 00 87
2643:00 00 00 00 00 00 00 00 8F
264B:00 00 00 00 00 00 00 00 97
2653:00 00 00 00 00 00 00 00 9F
265B:00 00 00 00 00 00 00 00 A7
```

Program 2: GeoConverter

```
FH 10 REM COPYRIGHT 1989 COMPU
      TE! PUBLICATIONS, INC. -
       ALL RIGHTS RESERVED
XG 20 REM THIS IS THE UPDATED
      {SPACE}GEOCONVERTER
      {8 SPACES}REVISED MAY IS
      SUE 1988 GAZETTE
AC 30 POKE 53280,0:POKE 53281,
      0:POKE 646,5:PRINTCHR$(1
      42);CHR$(147)
PS 40 FORI=1TO10:PRINT"{DOWN}"
      :NEXT
ER 50 PRINTTAB(5)"{4}UDI COPYR
      IGHT 1989"
SP 60 PRINTTAB(5)"GCH COMPUTE!
       PUBLICATIONS INC."
SP 70 PRINTTAB(5)"JFK ALL RIGH
      TS RESERVED{HOME}"
EP 80 PRINT"{DOWN}{RVS}{8}GEOC
      ONVERTER 1.1{OFF}{DOWN}
      {GRN}"
AP 90 INPUT"FILE TO CONVERT";G
      F$
CX 100 PRINT"{DOWN}SEARCHING F
       OR "GF$
PA 110 HD$="":FOR I=1 TO 4:REA
       D HE:HD$=HD$+CHR$(HE):N
       EXT
FK 120 FOR I=1TO5:READIE:ID$=I
       D$+CHR$(IE):NEXT
GD 130 NL$="":T$=CHR$(18):S$=C
       HR$(1):OPEN 15,8,15,"I0
       :":OPEN 2,8,2,"#"
JX 140 GOSUB370:GET #2,NT$,NS$
KB 150 FOR E=0 TO 7
KQ 160 D$=NL$:GET#2,B$:I=1:IFB
       $=NL$ THEN220
AX 170 IF ASC(B$)<>130 THEN220
HM 180 GET#2,HT$,HS$:I=3:IF HS
       $="" THEN HS$=CHR$(0)
FH 190 GET#2,B$:I=I+1:IF B$=""
        THEN B$=CHR$(0)
FA 200 IF ASC(B$)=160 THEN220
GD 210 D$=D$+B$:GOTO190
RK 220 FOR I=1 TO 31:GET#2,B$:
       NEXT
AX 230 IF D$=GF$ THEN260
EC 240 NEXT E:IF NT$=NL$ THEN2
       60
FX 250 T$=NT$:S$=NS$:GOTO140
CR 260 IF D$=NL$ THENPRINT"
       {DOWN}{RVS}FILE NOT FOU
       ND{OFF}":GOTO360
CP 270 PRINT"{DOWN}CONVERTING
       {SPACE}"GF$
MJ 280 DT$=T$:DS$=S$:T$=HT$:S$
       =HS$:GOSUB370
MB 290 GET#2,MT$,MS$:IF MS$=""
        THEN MS$=CHR$(0)
```

```
BM 300 FOR I=0 TO 65:GET #2,B$
       :NEXT
HG 310 GET#2,CT$,GT$:GOSUB370:
       PRINT#2,HD$;:GOSUB380:T
       $=DT$:S$=DS$:GOSUB370
FP 320 FOR I=0 TO 32*E+2:GET#2
       ,B$:NEXT
FQ 330 PRINT#2,MT$;MS$;:FORI=0
        TO 15:GET#2,B$:NEXT
GP 340 PRINT#2,HI$;HS$;CHR$(0)
       ;GT$;
KM 350 PRINT#2,ID$;:GOSUB380:P
       RINT:PRINTGF$" CONVERTE
       D"
ER 360 CLOSE2:CLOSE15:END
KA 370 U$="U1":GOTO390
RR 380 U$="U2"
KP 390 PRINT#15,U$;2;0;ASC(T$+
       "0");ASC(S$+"0")
AS 400 RETURN
FM 410 DATA 0,255,3,21,87,10,1
       ,0,0
```

BEFORE TYPING . . .

Before typing in programs, please refer to "How to Type In COMPUTE!'s Gazette Programs," elsewhere in this issue.

On the Border

Article on page 70.

Program 1: Spectrum

```
FH 10 REM COPYRIGHT 1989 COMPU
      TE! PUBLICATIONS, INC. -
       ALL RIGHTS RESERVED
MH 20 FORA 49152TO49246:READAA
      :POKEA,AA:NEXT
XD 30 DATA120,169,36,141,20,3,
      169,192
HX 40 DATA141,21,3,173,17,208,
      41,127,141
CJ 50 DATA17,208,169,44,141,18
      ,208,169,1
PR 60 DATA141,26,208,169,127,1
      41,13,220
MX 70 DATA88,96,238
HK 80 DATA32:REM SCREEN
PM 90 DATA208,24,173,18,208
QX 100 DATA105,8,141,18,208,14
       4,33,238,54
XM 110 DATA192,169,44,201,52,2
       08,8,206,71
GA 120 DATA192,169,44,141,54,1
       92,141,18
BX 130 DATA208,169,0,141
GR 140 DATA32:REM SCREEN
JC 150 DATA208,169,1,141
JX 160 DATA25,208,76,49,234,16
       9,1,141,25
KH 170 DATA208,104,168,104,170
       ,104,64,0
FB 180 SYS 49152
```

Program 2: Band

```
GH 200 REM COPYRIGHT 1989 COMP
       UTE! PUBLICATIONS, INC.
        - ALL RIGHTS RESERVED
HQ 210 REM *BAND*
SG 220 FORA=49247TO49402:READA
       A:POKEA,AA:NEXT
XA 230 DATA120,169,132,141,20,
       3,169,192
FC 240 DATA141,21,3,173,17,208
       ,41,127,141
GE 250 DATA17,208,173,232,192,
       141,18,208
CJ 260 DATA169,1,141,26,208,16
       9,127,141
DC 270 DATA13,220,88,96,162,1,
       224,8,240
ME 280 DATA30,189,233,192,141
GP 290 DATA32:REM SCREEN
BM 300 DATA208,238
GE 310 DATA133,192,24,173,232,
       192,125,242
MP 320 DATA192,141,18,208,169,
       1,141,25
AF 330 DATA208,104,168,104,170
       ,104,64,173
DG 340 DATA233,192,141
RJ 350 DATA32:REM SCREEN
CX 360 DATA208,169,1,141
GB 370 DATA133,192,169,0,208,2
       2,24,238
PX 380 DATA232,192,173,232,192
       ,141,18,208
QG 390 DATA201,194,208,27,169,
       1,141,180
GX 400 DATA192,76,224,192,24,2
       06,232,192
AK 410 DATA173,232,192,141,18,
       208,201,50
XQ 420 DATA208,5,169,0,141,180
       ,192,169,1
XP 430 DATA141,25,208,76,49,23
       4,50
QS 440 DATA0,11,12,15,1,15,12,
       11:REM COLOR
RS 450 DATA0,0,8,16,24,32,40,4
       8,56,0
DE 460 SYS 49247
```

Program 3: Pulse

```
FM 500 REM COPYRIGHT 1989 COMP
       UTE! PUBLICATIONS, INC.
        - ALL RIGHTS RESERVED
JF 510 REM PULSE
FB 520 FORA=49403TO49616:READA
       A:POKEA,AA:NEXT
PH 530 DATA120,169,32,141,20,3
       ,169,193
BF 540 DATA141,21,3,173,17,208
       ,41,127,141
RA 550 DATA17,208,173,184,193,
       141,18,208
DF 560 DATA169,1,141,26,208,16
       9,127,141
DX 570 DATA13,220,88,96,162,1,
       224,8,240
KX 580 DATA26,189,192,193,141
EJ 590 DATA32:REM SCREEN
BD 600 DATA208,189
HJ 610 DATA184,193,141,18,208,
       238,33,193
KR 620 DATA169,1,141,25,208,10
       4,168,104
PG 630 DATA170,104,64,173,192,
       193,141
RS 640 DATA32:REM SCREEN
RX 650 DATA208,169,1,141,33,19
       3,169,0,208
SG 660 DATA47,162,0,56,189,184
       ,193,253
FS 670 DATA200,193,157,184,193
       ,232,224,4
XB 680 DATA208,241,24,189,184,
       193,125,200
SP 690 DATA193,157,184,193,232
       ,224,8,208
DQ 700 DATA241,173,184,193,201
       ,62,208,52
XH 710 DATA169,1,141,76,193,76
       ,170,193
SC 720 DATA162,0,24,189,184,19
       3,125,200
AF 730 DATA193,157,184,193,232
       ,224,4,208
EC 740 DATA241,56,189,184,193,
       253,200,193
HF 750 DATA157,184,193,232,224
       ,8,208,241
HQ 760 DATA173,184,193,201,142
       ,208,5,169
FA 770 DATA0,141,76,193,173,18
       4,193,141
JG 780 DATA18,208,169,1,141,25
       ,208,76,49
QE 790 DATA234,142,144,146,148
       ,151,153
XM ■■■ DATA155,157
RB 810 DATA0,11,12,15,1,15,12,
       11:REM COLOR
QK 820 DATA4,3,2,1,1,2,3,4,0
CK 830 SYS 49403
```

Program 4: Off

```
EK 2000 REM COPYRIGHT 1989 COM
        PUTE! PUBLICATIONS, IN
        C. - ALL RIGHTS RESERV
        ED
MM 2010 REM OFF
GA 2020 FORA=49974TO50007:READ
        AA:POKEA,AA:NEXT
SH 2030 DATA120,169,49,141,20,
        3,169,234
JX 2040 DATA141,21,3,169,8,141
        ,22,208,169
KX 2050 DATA0:REM COLOR
RB 2060 DATA141
GR 2070 DATA32:REM SCREEN
JJ 2080 DATA208,169,0,141,26,2
        08
AQ 2090 DATA169,129,141,13,220
        ,88,96,0
AM 2100 SYS 49974
```

EZ Bar Charter

Article on page 48.

```
FH 10 REM COPYRIGHT 1989 COMPU
      TE! PUBLICATIONS, INC. -
       ALL RIGHTS RESERVED
XF 20 PRINT"{CLR}"TAB(11)"
      {RVS}{3 SPACES}GRAPH MAK
      ER{3 SPACES}{OFF}"
KR 30 PRINTTAB(12)"{DOWN}COPYR
      IGHT 1989":PRINTTAB(7)"C
      OMPUTE! PUBLICATIONS, IN
      C."
AA 40 PRINTTAB(10)"ALL RIGHTS
      {SPACE}RESERVED"
DE 50 FORX=0TO2000:NEXT
PD 60 PRINT"{CLR}{2 DOWN}"TAB(
      9)"{RVS} Y-AXIS {OFF} GR
      APH RANGE"
MC 70 PRINTTAB(14)"{3 DOWN}
      {RVS} 1 {OFF} 0-40":PRIN
      TTAB(14)"{DOWN}{RVS} 2
      {OFF} 0-100"
MS 80 PRINTTAB(14)"{DOWN}{RVS}
       3 {OFF} 0-200"
BR 90 PRINT"{3 DOWN}"TAB(12)"S
      ELECT (1-3) "
AR 100 GETI$:IFI$<"1"OR I$>"3"
       THEN100
BQ 110 I=VAL(I$):IF I=1 THENMA
       X=40
DC 120 IF I=2 THENMAX=100
JA 130 IF I=3 THENMAX=200
DD 140 PRINT"{2 DOWN} HOW MANY
        ITEMS WILL BE GRAPHED?
        (1-8)"
CB 150 GETL$:IF L$<"1"ORL$>"8"
       THEN150
FA 160 L=VAL(L$):PRINT"{CLR}
```

```
        {DOWN} ENTER A 3 CHARAC
        TER LABEL AND A VALUE"
FH 170  PRINT" FOR EACH ITEM TO
         BE GRAPHED. THE VALUE"
EH 180  PRINT" ENTERED MUST FAL
        L BETWEEN 0 -";MAX;"
        {DOWN}"
AR 190  FORX=1 TO L
JX 200  PRINT"{DOWN} LABEL";X;:
        INPUTM$(X)
AX 210  IFLEN(M$(X))<>3THENPRIN
        T"{3 UP}":GOTO200
BH 220  PRINTTAB(17)"{UP}VALUE
        {SPACE}FOR ";M$(X);:INP
        UTH(X)
HG 230  IFH(X)<0ORH(X)>MAXTHEN2
        20
SA 240  NEXT
CK 250  PRINT"{CLR}{DOWN} ENTER
         A TITLE ,25 CHARACTERS
         OR LESS){3 SPACES}FOR
        {SPACE}YOUR GRAPH."
SC 260  INPUT"{DOWN} TITLE: ";G
        T$
SD 270  IFLEN(GT$)>25ORLEN(GT$)
        <1THEN250
GK 280  PRINT"{CLR}{2 DOWN}
        {RVS} GRAPHING RANGE
        {OFF}{2 SPACES}0 -";MAX
BQ 290  PRINT"{DOWN} {RVS} GRAP
        H LABELS {OFF}
        {5 SPACES}{RVS} VALUE
        {OFF}{DOWN}"
DD 300  FORX=1TOL
BK 310  PRINTTAB(5)M$(X);TAB(21
        )H(X):NEXTX
FD 320  PRINT"{DOWN} {RVS} GRAP
        H TITLE {OFF} ";GT$
JE 330  PRINT"{2 DOWN}
        {7 SPACES}{RVS}EVERYTHI
        NG CORRECT? Y/N{OFF}"
QR 340  GETK$:IFK$=""THEN340
CQ 350  IFK$="N"THEN60
EB 360  PRINT"{CLR}{10 SPACES}"
        ;GT$:FORX=0TO19:PRINT"
        {5 SPACES}{Q}":NEXTX
MR 370  PRINT"{5 SPACES}{34 Y}"
JP 380  PRINTTAB(6);
HJ 390  FORX=1TOL
KQ 400  PRINTH(X);
QJ 410  NEXT:PRINT
PQ 420  PRINT"{DOWN}{7 SPACES}"
        ;:FORTT=1TOL:PRINTM$(TT
        );" ";:NEXT:PRINT"
        {HOME}"
BH 430  PRINT"{2 SPACES}";:IFMA
        X>40THENPRINT"{LEFT}";
JC 440  PRINTMAX
RF 450  IFI=1THEN480
RS 460  IFI=2THEN500
QD 470  IFI=3THEN520
GA 480  FORX=36TO10STEP-4:PRINT
        "{DOWN}{2 SPACES}" X:NE
        XT
KQ 490  FORX=8TO0STEP-4:PRINT"
        {DOWN}{3 SPACES}";X:NEX
        TX:GOTO540
CQ 500  FORX=90TO10STEP-10:PRIN
        T"{DOWN}{2 SPACES}" X:N
        EXTX:PRINT"{DOWN}
        {4 SPACES}0"
GE 510  GOTO540
RX 520  FORX=180TO100STEP-20:PR
        INT"{DOWN}{2 SPACES}
        {LEFT}"X:NEXTX
DR 530  FORX=80TO0STEP-20:PRINT
        "{DOWN}{2 SPACES}"X:NEX
        TX:PRINT"{UP}{4 SPACES}
        0":GOTO540
HD 540  D=2:X=0:R=37:FORX=1TOL:
        PRINT"{HOME}":R=R+4:FOR
        SP=1TO3:PRINTSPC(255):N
        EXTSP
GQ 550  PRINTSPC(R)
JG 560  D=D+4:PRINT"{UP} {2 +}
        {K}"
SB 570  IFI<3ANDH(X)=0THEN700
XR 580  IFI=3ANDH(X)<10THEN700
GH 590  IFI=1ANDH(X)<4THEN680
KA 600  IFI=2ANDH(X)<=5 THEN680
BQ 610  IFI=3ANDH(X)<=20THEN680
HP 620  IFI=1THENY=INT(H(X)/2)-
        1:GOTO670
FR 630  IFI=3THENY=INT(H(X)/10)
        -1:GOTO670
EE 640  IFI=2THENAA=H(X)/10:BB=
        INT(H(X)/10):CC=AA-BB:I
        FCC=0THENY=BB*2-1:GOTO6
        70
JA 650  IFCC<=.5THENY=BB*2
AJ 660  Y=BB*2+1
SR 670  FORB=1TOY-1:PRINTTAB(D)
        "{2 UP} {2 +}{K} ":NEXT
        B
QH 680  PRINTTAB(D)"{2 UP}
        {2 SPACES}{I}{F}":NEXTX
GA 690  IFX=L+1THEN710
RK 700  NEXTX
PF 710  D=2
RF 720  D=D+4:IFH(X)=0THEN740
ER 730  PRINTTAB(D):PRINTH(X):N
        EXT
GQ 740  GETK$:IFK$=""THEN740
MK 750  IFK$="A"THENRUN
XJ 760  IFK$="P"THEN790
FH 770  PRINT"{HOME}{23 DOWN}
        {7 SPACES}{RVS} 'P' TO
        {SPACE}PRINT 'A' FOR AN
        OTHER "
HG 780  GOTO740
CD 790  PRINT"{HOME}{23 DOWN}
        {37 SPACES}"
CR 800  OPEN6,4,6:PRINT#6,CHR$(
        15):CLOSE6
SD 810  OPEN3,3,3:OPEN4,4:PRINT
        "{HOME}";:FORC=0TO1022:
        GET#3,A$:PRINT#4,A$;:NE
        XT
AF 820  PRINT"{CLR}":PRINT#4:CL
        OSE4:CLOSE3:GOTO360
```

SpeedScript 128 Plus

See instructions in article on page 38 before typing in.

```
3A00:20 D6 1D 20 C1 3A 20 DF F6
3A08:3A 20 D0 3A 20 DF 3A A9 FD
3A10:31 8D 09 3B 20 58 3A 90 BC
3A18:03 4C 53 3A 20 C1 3A 20 CB
3A20:CF FF AA 20 B7 FF D0 07 3A
3A28:8A 20 0C 1D 4C 1F 3A A9 3A
3A30:02 20 C3 FF A9 12 8D 09 60
3A38:3B 20 58 3A 90 02 B0 13 02
3A40:20 D0 3A 20 CF FF AA 20 36
3A48:B7 FF D0 07 8A 20 0C 1D 2D
3A50:4C 43 3A A9 02 4C C3 FF 66
3A58:A2 08 A9 02 A0 08 20 BA 95
3A60:FF A9 0F A2 00 20 68 FF 9C
3A68:A9 05 A2 05 A0 3B 20 BD 87
3A70:FF A9 02 20 C3 FF 20 C0 B0
3A78:FF B0 14 A2 02 20 C6 FF E3
3A80:B0 0D 20 CF FF 20 CF FF B1
3A88:20 B7 FF D0 02 18 60 A9 E2
3A90:02 20 C3 FF 20 45 30 A9 A6
3A98:00 85 0C A9 08 20 F7 27 62
3AA0:A9 9F 20 68 26 A9 25 85 04
3AA8:0C 20 F5 27 A9 0B A0 3B 52
3AB0:20 18 1E 20 E4 FF F0 FB 06
3AB8:C9 0D D0 03 4C 0F 3A 38 EA
3AC0:60 A2 12 A9 10 20 07 1D 17
3AC8:A9 00 A2 13 20 07 1D 60 4F
3AD0:A2 12 A9 18 20 07 1D A9 D2
3AD8:00 A2 13 20 07 1D 60 A2 6A
3AE0:00 A0 00 A9 35 85 FB A9 79
3AE8:3B 85 FC B1 FB C9 00 F0 0F
3AF0:06 20 0C 1D C8 D0 F4 A9 E0
3AF8:20 20 0C 1D C8 D0 F8 E8 3D
3B00:E0 08 D0 F3 60 48 45 4C 3D
3B08:50 31 00 49 4E 53 45 52 24
3B10:54 20 44 49 53 4B 20 41 1F
3B18:4E 44 20 50 52 45 53 53 71
3B20:20 D2 C5 D4 D5 D2 CE 20 19
3B28:28 C1 20 54 4F 20 41 42 2C
3B30:4F 52 54 29 00 4E 4F 20 F7
3B38:48 45 4C 50 20 53 43 52 D9
3B40:45 45 4E 20 49 4E 20 4D B7
3B48:45 4D 4F 52 59 00 20 2F FD
3B50:1E A9 36 A2 12 20 07 1D 6D
3B58:A9 D0 E8 20 07 1D A2 00 E8
3B60:BD 7B 3B 20 0C 1D E8 8A 2F
3B68:29 07 D0 0A A0 08 A9 00 68
3B70:20 0C 1D 88 D0 FA E0 90 EA
3B78:90 E6 60 00 FF 7E 3C 18 87
3B80:00 00 00 18 3C 7E 00 7E D2
3B88:3C 18 00 FF C0 FC F0 FF FE
3B90:F0 FC 00 FF 03 3F 0F FF F1
3B98:0F 3F 00 00 18 18 FF 00 87
3BA0:00 00 00 00 00 00 FF 18 2F
3BA8:18 18 00 FF C0 C0 C0 C0 7C
3BB0:C0 C0 FF FF 00 00 00 00 B7
3BB8:00 00 FF FF 03 03 03 03 5C
3BC0:03 03 FF FF C0 CF C0 C0 01
3BC8:C0 C0 FF FF 00 FF 00 00 CF
3BD0:00 00 FF FF 03 F3 03 03 38
3BD8:03 03 FF FF C0 C0 C0 C0 DC
3BE0:CF C0 FF FF 00 00 00 00 6F
3BE8:FF 00 FF FF 03 03 03 03 8C
3BF0:F3 03 FF FF C0 CF C0 C0 A9
3BF8:CF C0 FF FF 00 FF 00 00 87
3C00:FF 00 FF FF 03 F3 03 03 69
3C08:F3 03 FF C9 84 F0 03 4C 12
3C10:F8 1E A5 D3 29 01 F0 03 B0
3C18:4C F8 1E A5 D3 29 08 F0 57
3C20:02 D0 31 A9 10 A2 0C 20 D1
3C28:07 1D A9 00 A2 0D 20 07 31
3C30:1D 20 E4 FF F0 FB C9 84 6B
3C38:D0 10 A9 18 A2 0C 20 07 60
3C40:1D 20 E4 FF F0 FB C9 84 7B
3C48:F0 D1 A9 00 A2 0C 20 07 6F
3C50:1D 4C F8 1E A9 00 8D 7C 50
3C58:35 8D 7D 35 8D 07 46 A0 87
3C60:00 99 0B 46 C8 C0 10 90 FE
3C68:F8 A2 00 BD 05 2B 9D 7E 70
3C70:35 E8 E0 0C 90 F5 AD 0A 5C
3C78:35 85 FB AD 0B 35 85 FC 7C
3C80:A0 00 A9 FB 8D B2 03 20 9B
3C88:AE 03 30 15 E6 FB D0 02 3B
3C90:E6 FC A5 FC C5 2A 90 EF 28
3C98:A5 FB C5 29 90 E9 4C 09 FB
3CA0:3D A2 00 DD 00 3D F0 08 1D
3CA8:E8 E0 09 90 F6 4C 8C 3C 36
3CB0:8A 0A AA A9 3C 48 A9 C1 F8
3CB8:48 BD F6 45 48 BD F5 45 62
3CC0:48 60 38 98 65 FB 85 FB 28
3CC8:A9 00 65 FC 85 FC A0 00 F3
3CD0:4C 92 3C 20 36 2F 88 8C A9
3CD8:7C 35 C8 60 20 36 2F 88 BC
3CE0:8C 7D 35 C8 60 AD 07 46 40
3CE8:49 01 8D 07 46 60 AD 07 7E
3CF0:46 49 04 8D 07 46 60 AD F7
3CF8:07 46 49 02 8D 07 46 60 45
3D00:8C 92 88 86 A1 93 83 85 C6
3D08:96 A9 00 A8 20 9A 26 20 9A
3D10:C9 1D 20 FE 3D A0 6D AD 9F
3D18:7E 35 20 E6 3D AD 7F 35 66
3D20:20 E6 3D A2 00 A0 6E BD 53
3D28:0B 46 F0 03 20 E6 3D E8 08
3D30:E0 10 90 F3 A9 14 85 0C 25
3D38:20 F5 27 AD 07 46 F0 17 4A
3D40:18 6A B0 23 6A B0 32 A9 CD
3D48:70 20 0C 1D A9 A0 20 0C 72
3D50:1D 20 0C 1D 4C 84 3D A9 4D
3D58:A0 20 0C 1D 20 0C 1D A9 93
3D60:6F 20 0C 1D 4C 84 3D A9 86
3D68:70 20 0C 1D A9 A0 20 0C 92
3D70:1D A9 6F 20 0C 1D 4C 84 C5
```

```
3D78:3D A9 A0 20 0C 1D 20 0C 33
3D80:1D 20 0C 1D A9 27 85 0C E5
3D88:20 F5 27 A9 13 20 0C 1D 5E
3D90:A9 20 20 0C 1D AD 83 35 88
3D98:18 69 30 C9 3A 90 02 A9 DD
3DA0:AA 20 0C 1D A9 40 85 0C 31
3DA8:20 F5 27 A2 00 AD 7C 35 A4
3DB0:F0 01 E8 AD 7D 35 F0 04 82
3DB8:8A 09 02 AA 86 0C 8A 0A 29
3DC0:65 0C AA A0 03 BD DA 3D 52
3DC8:20 0C 1D E8 88 D0 F6 20 1E
3DD0:E4 FF F0 FB 20 69 1E 4C CA
3DD8:F8 1E 73 74 75 76 77 78 F9
3DE0:79 7A 7B 7C 7D 7E 18 69 6D
3DE8:4F C9 A0 90 04 A9 9F A0 41
3DF0:BE 85 0C 8A 48 20 F5 27 2C
3DF8:68 AA 98 4C 0C 1D A2 10 54
3E00:A0 04 A9 71 20 0C 1D 88 0E
3E08:D0 FA A9 72 20 0C 1D CA 3E
3E10:D0 EE 60 20 42 0F 02 20 31
3E18:4B 0F 04 01 04 05 0B 2C 05
3E20:20 01 0E 04 20 4D 09 03 3A
3E28:08 01 05 0C 20 47 12 15 A1
3E30:02 05 12 00 8E 7D 35 8E 94
3E38:07 46 60 CC 8A 35 F0 06 B3
3E40:AD 7E 35 8D 8B 35 84 54 41
3E48:84 56 8C 08 46 8C 09 46 6B
3E50:8C 0A 46 A9 FF 8D 1C 46 AD
3E58:A9 54 85 FD A9 36 85 FE 7F
3E60:60 20 AE 03 30 21 EE 8B 8A
3E68:35 29 7F C9 20 F0 06 A9 D0
3E70:01 85 56 D0 07 A5 56 F0 13
3E78:03 EE 08 46 38 AD 7F 35 44
3E80:ED 8B 35 8D F8 39 60 C9 8D
3E88:A0 F0 DB D0 EF 8C 17 35 2F
3E90:AD 8B 35 8D FE 39 60 20 04
3E98:AE 03 30 04 CE 8B 35 60 E2
3EA0:C9 A0 D0 06 CE 08 46 4C 14
3EA8:9C 3E C9 AD D0 18 29 7F CF
3EB0:48 EE 8B 35 20 7C 3E 90 D1
3EB8:0E 68 91 FD E6 54 68 68 2A
3EC0:A9 2C 48 A9 AC 48 60 68 70
3EC8:CE 8B 35 60 AC 17 35 88 F0
3ED0:CE FE 39 AD FE 39 8D 8B F9
3ED8:35 60 8C 17 35 C9 20 D0 EC
3EE0:06 20 9C 3E CE 08 46 C9 CC
3EE8:1F F0 1C AD 1C 46 10 17 C0
3EF0:20 7C 3E A2 00 38 ED 08 53
3EF8:46 90 03 E8 B0 F8 6D 08 F7
3F00:46 8D 0A 46 8E 09 46 AD 7D
3F08:8B 35 8D FE 39 60 A5 54 26
3F10:48 20 4F 3F 68 85 54 60 FA
3F18:38 AD FE 39 ED 7E 35 90 F5
3F20:08 F0 06 8D FE 39 4C C9 B7
3F28:2D A9 00 8D FE 39 60 AD CB
3F30:17 35 18 65 54 60 AD FE 5F
3F38:39 85 55 20 F8 31 A5 54 8D
3F40:F0 0C A5 55 D0 08 68 68 24
3F48:A9 2C 48 A9 66 48 60 A0 FF
3F50:00 8C 8C 35 AC 81 35 8B 35
3F58:F0 0B 30 09 8C 8C 35 20 C9
3F60:EC 2D 88 D0 FA AD 7C 35 7B
3F68:F0 47 20 6E 40 A9 54 85 F2
3F70:9E A9 37 85 9F 20 9E 40 E2
3F78:08 18 98 65 9E 85 9E A9 5C
3F80:00 65 9F 85 9F A5 55 F0 D3
3F88:14 A9 24 85 FD A9 46 85 01
3F90:FE 20 C9 2D 20 F8 31 20 0A
3F98:EC 2D EE 8C 35 28 B0 D5 01
3FA0:AC 23 46 F0 09 20 EC 2D E5
3FA8:EE 8C 35 88 D0 F7 20 BB 23
3FB0:40 60 38 AD 82 35 ED 8C 9A
3FB8:35 90 0C F0 0A A8 20 EC A6
3FC0:2D EE 8C 35 88 D0 F7 AD 9B
3FC8:7D 35 D0 03 4C 45 40 20 B5
3FD0:6E 40 A9 54 85 9E A9 38 43
3FD8:85 9F 20 9E 40 08 18 98 DA
3FE0:65 9E 85 9E A9 00 65 9F 0C
3FE8:85 9F AD 23 46 F0 1E 18 44
3FF0:6D 8C 35 CD 80 35 90 09 CF
3FF8:28 A2 03 20 47 42 4C 42 B4
4000:40 AC 23 46 20 EC 2D EE 92
4008:8C 35 88 D0 F7 A5 55 F0 2C
4010:14 A9 24 85 FD A9 46 85 8A
4018:FE 20 C9 2D 20 F8 31 20 93
4020:EC 2D EE 8C 35 28 90 1A 8E
4028:20 9E 40 08 18 98 65 9E 75
4030:85 9E A9 00 65 9F 85 9F A4
4038:AD 8C 35 CD 80 35 90 CD FD
4040:B0 B6 20 8B 40 AD 80 35 72
4048:38 ED 8C 35 90 09 F0 07 D6
4050:A8 20 EC 2D 88 D0 FA AD C8
4058:90 35 C9 03 D0 0D A0 50 24
4060:A9 A8 20 15 2B 88 D0 FA 4D
4068:20 EC 2D 4C 6D 2D AD 7E 98
4070:35 8D 20 46 AD 7F 35 8D BA
4078:21 46 AD 07 46 8D 22 46 34
4080:A9 00 8D 07 46 A9 02 8D 62
4088:23 46 60 AD 20 46 8D 7E C6
4090:35 AD 21 46 8D 7F 35 AD 22
4098:22 46 8D 07 46 60 A0 00 D2
40A0:A2 00 86 54 86 55 86 56 75
40A8:AD 7F 35 38 ED 7E 35 85 61
40B0:53 B1 9E 30 30 C9 1F F0 F5
40B8:2A 9D 24 46 E6 55 E8 C8 C5
40C0:E6 54 A5 53 C5 55 B0 E9 82
40C8:C6 54 A2 00 98 48 20 47 B3
40D0:42 68 A8 B1 9E C9 1F F0 08
40D8:3A C9 9F F0 03 C8 D0 F3 A4
40E0:C8 38 60 18 60 C9 8C D0 75
40E8:0A C8 20 0A 42 8D 7E 35 BF
40F0:4C A0 40 C9 92 D0 0A C8 19
40F8:20 0A 42 8D 7F 35 4C A0 37
4100:40 C9 93 D0 0A C8 20 0A 52
4108:42 8D 23 46 4C A0 40 C9 07
4110:BA D0 40 20 9D 41 E6 56 44
4118:A5 3B D0 03 4C B1 40 A5 D5
4120:56 C9 02 F0 07 90 09 A2 BE
4128:01 4C CC 40 A5 53 D0 05 FC
4130:A5 53 4A 46 3B 38 E5 55 E3
4138:90 51 E5 3B 90 4D F0 4B AE
4140:85 3B A9 20 9D 24 46 E8 7E
4148:E6 54 E6 55 C6 3B D0 F4 3F
4150:4C B1 40 C9 9F D0 03 C8 19
4158:38 60 C9 A3 D0 0E 9D 24 A0
4160:46 20 CF 41 18 65 55 85 A2
4168:55 4C BE 40 C9 C1 90 0A 05
4170:C9 DB B0 06 9D 24 46 4C 9B
4178:BE 40 8A 48 98 48 A2 02 6D
4180:20 47 42 68 A8 68 AA C8 B8
4188:4C B1 40 8A 48 98 48 A2 26
4190:04 20 47 42 68 A8 68 AA 8B
4198:A9 01 4C 40 41 C8 98 48 64
41A0:A9 00 85 3B B1 9E 30 09 CD
41A8:C9 1F F0 11 E6 3B C8 D0 8D
41B0:F3 29 7F C9 1F D0 02 F0 35
41B8:04 C9 3A D0 03 68 A8 60 6F
41C0:C9 23 D0 EA 20 CF 41 18 94
41C8:65 3B 85 3B C8 D0 D5 AD 14
41D0:86 35 D0 14 AD 85 35 C9 F6
41D8:0A B0 03 A9 01 60 C9 64 09
41E0:B0 03 A9 02 60 A9 03 60 E1
41E8:C9 03 90 F9 F0 09 C9 27 29
41F0:90 0C F0 0D A9 05 60 AD 7D
41F8:85 35 C9 E8 90 E7 A9 04 CE
4200:60 AD 85 35 C9 10 90 F6 CA
4208:B0 EA A9 00 8D 6E 35 8D F2
4210:6F 35 8D 70 35 8D 71 35 4A
4218:38 BI 9E E9 30 90 25 C9 6F
4220:0A B0 21 0E 6E 35 2E 6F EE
4228:35 0E 6E 35 2E 6F 35 0E 93
4230:6E 35 2E 6F 35 0E 6E 35 E9
4238:2E 6F 35 0D 6E 35 8D 6E F8
4240:35 C8 D0 D4 4C F4 29 8A 0C
4248:0A 48 20 CB 1E A9 AA A0 32
4250:42 20 18 1E 68 AA BD 9E EA
4258:43 BC 9F 43 20 18 1E A9 1D
4260:88 A0 42 20 18 1E 20 E4 F9
4268:FF F0 FB C9 41 F0 0A 20 47
4270:CB 1E A9 8B A0 34 4C 18 D6
4278:1E 4C 24 2D D0 07 A2 05 63
4280:20 47 42 E6 FC 4C AE 03 17
4288:D0 D2 C5 D3 D3 20 41 20 E1
4290:D4 CF 20 C1 C2 CF D2 D4 63
4298:2C 20 52 45 54 20 D4 CF 76
42A0:20 C3 CF CE D4 C9 CE D5 4E
42A8:C5 00 D7 C1 D2 CE C9 CE 5B
42B0:C7 3A 20 00 48 45 41 44 C9
42B8:45 52 2F 46 4F 54 45 64
42C0:52 20 4C 49 4E 45 20 54 B0
42C8:4F 4F 20 4C 4F 4E 47 2E 02
42D0:2E 2E 20 20 20 20 20 20 DF
42D8:20 20 00 54 4F 4F 20 4D FF
42E0:41 4E 59 20 46 49 45 4C F4
42E8:44 53 20 49 4E 20 48 45 C5
42F0:41 44 45 52 2F 46 4F 4F 75
42F8:54 45 52 2E 2E 20 20 B0
4300:20 00 49 4C 4C 45 47 41 CB
4308:4C 20 46 4F 52 4D 41 54 19
4310:20 43 48 41 52 41 43 54 07
4318:45 52 20 49 4E 20 48 44 36
4320:52 2F 46 54 52 2E 2E 20 71
4328:00 4E 4F 54 20 45 4E 4F 73
4330:55 47 48 20 52 4F 4F 4D F9
4338:20 46 4F 52 20 46 4F 4F 77
4340:54 45 52 2E 2E 2E 20 16
4348:20 20 20 20 20 20 20 00 AE
4350:48 2F 46 20 46 4F 52 4D F2
4358:41 54 20 49 4D 50 4F 53 CA
4360:53 53 49 42 4C 45 20 2D 97
4368:20 43 48 45 43 4B 20 46 FA
4370:49 45 4C 44 53 20 00 48 1E
4378:2F 46 20 42 55 46 46 45 E5
4380:52 20 4F 56 45 52 46 4C D3
4388:4F 57 20 2D 20 54 52 55 AF
4390:4E 43 41 54 49 4E 47 20 AE
4398:4C 49 4E 45 20 00 B4 42 62
43A0:DB 42 02 43 29 43 50 43 54
43A8:77 43 C9 A1 F0 03 4C 11 4C
43B0:44 20 BA 43 20 3A 2E 4C 7F
43B8:29 2E C8 20 AF 29 F0 3F BD
43C0:A2 00 DD 0B 46 90 07 F0 78
43C8:40 E8 E0 10 90 F4 48 CA 7A
43D0:8E 1B 46 E0 08 B0 14 A2 0A
43D8:0E BD 0B 46 9D 0C 46 CA 10
43E0:EC 1B 46 D0 F4 68 9D 0C 0B
43E8:46 D0 1E A2 00 BD 0C 46 0A
43F0:9D 0B 46 E8 EC 1B 46 90 51
43F8:F4 68 9D 0B 46 D0 0A A2 A4
4400:00 9D 0B 46 E8 E0 10 D0 71
4408:F8 20 AE 03 C9 1F D0 AA 32
4410:60 C9 9E D0 07 A9 01 8D 8A
4418:1C 46 D0 21 C9 AE D0 0C 23
4420:A9 00 8D 1C 46 A9 2E 8D B3
4428:1D 46 D0 11 C9 DE F0 03 AA
4430:4C 88 2C A9 00 8D 1C 46 D5
4438:A9 9E 8D 1D 46 20 CA 44 4D
4440:20 D9 44 20 EF 44 A0 00 AB
4448:20 AE 03 C9 AA D0 0A C8 FE
4450:20 AE 03 8D 1E 46 4C 5F CF
4458:44 A9 20 8D 1E 46 88 20 85
4460:CA 44 20 A9 44 8D 1F 46 DA
4468:F0 3A AE 1C 46 D0 1E A0 E1
4470:FF C8 20 AE 03 CD 1D 46 E9
4478:F0 13 C9 1F F0 0F C9 A0 61
4480:F0 04 29 80 D0 EB CE 1F A2
4488:46 D0 E6 F0 17 AD 1E 46 46
4490:A0 FF C8 91 FD CE 1F 46 4B
4498:D0 F8 C8 20 D9 44 20 EF F2
44A0:44 20 E6 44 A0 00 4C 77 89
44A8:2C AD 8B 35 A2 00 DD 0B 53
44B0:46 90 07 E8 E0 10 90 F6 4F
44B8:B0 0B BD 0B 46 CD 7F 35 62
44C0:90 03 AD 8B 35 38 ED 8B B2
44C8:35 60 C8 98 18 65 FB 85 7A
44D0:FB A9 00 65 FC 85 FC 88 98
44D8:60 98 18 65 FD 85 FD A9 BC
44E0:00 65 FE 85 FE 60 98 18 BD
44E8:6D 8B 35 8D 8B 35 60 98 15
44F0:18 65 54 85 54 60 A5 55 86
44F8:F0 26 AD 07 46 29 01 F0 73
4500:06 20 27 45 4C 18 45 AD C9
4508:07 46 29 02 D0 12 AD 07 1E
4510:46 29 04 F0 03 20 31 45 D7
4518:A9 00 8D 09 46 8D 0A 46 7C
4520:A0 00 84 53 84 56 60 20 1F
4528:7C 3E 18 4E F8 39 4C 34 E1
4530:45 20 7C 3E AC F8 39 F0 85
4538:0D AD 1C 46 10 08 A9 20 B0
4540:20 15 2B 88 D0 FA 60 E6 28
4548:53 C9 20 F0 02 E6 56 20 7A
4550:15 2B C9 20 D0 1C A5 56 04
4558:E0 18 A9 20 AE 09 46 F0 AF
4560:06 20 15 2B CA D0 FA AE 89
4568:0A 46 F0 06 20 15 2B CE 82
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4570:0A 46 60 C9 43 D0 23 AD 8B
4578:07 46 49 01 8D 07 46 29 8F
4580:01 F0 04 A5 53 F0 03 4C 53
4588:1A 32 A5 55 F0 F9 8C FF 3F
4590:39 20 27 45 AC FF 39 4C 1D
4598:1A 32 C9 56 D0 0B AD 07 70
45A0:46 49 02 8D 07 46 4C 1A BD
45A8:32 C9 45 D0 23 AD 07 46 98
45B0:49 04 8D 07 46 29 04 F0 D2
45B8:04 A5 53 F0 03 4C 1A 32 D7
45C0:A5 55 F0 F9 8C FF 39 20 28
45C8:31 45 AC FF 39 4C 1A 32 34
45D0:C9 20 D0 0B AA A9 32 48 BB
45D8:A9 19 48 8A 4C 47 45 C9 04
45E0:5F D0 08 A9 0D 20 15 2B 29
45E8:4C 1A 32 C9 2D D0 03 4C 02
45F0:1A 32 4C 68 32 D9 2E E3 5E
45F8:2E D2 3C DB 3C B9 43 01 E4
4600:2F E4 3C ED 3C F6 3C 00 F9
4608:00 00 00 00 00 00 00 00 94
4610:00 00 00 00 00 00 00 00 9C
4618:00 00 00 00 00 00 00 00 A4
4620:00 00 00 00 00 00 00 00 AC
4628:00 00 00 00 00 00 00 00 B4
4630:00 00 00 00 00 00 00 00 BC
4638:00 00 00 00 00 00 00 00 C4
4640:00 00 00 00 00 00 00 00 CC
4648:00 00 00 00 00 00 00 00 D4
4650:00 00 00 00 00 00 00 00 DC
4658:00 00 00 00 00 00 00 00 E4
4660:00 00 00 00 00 00 00 00 EC
4668:00 00 00 00 00 00 00 00 F4
4670:00 00 00 00 00 00 00 00 FC
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46A8:00 00 00 00 00 00 00 00 35
46B0:00 00 00 00 00 00 00 00 3D
46B8:00 00 00 00 00 00 00 00 45
46C0:00 00 00 00 00 00 00 00 4D
46C8:00 00 00 00 00 00 00 00 55
46D0:00 00 00 00 00 00 00 00 5D
46D8:00 00 00 00 00 00 00 00 65
46E0:00 00 00 00 00 00 00 00 6D
46E8:00 00 00 00 00 00 00 00 75
46F0:00 00 00 00 00 00 00 00 7D
46F8:00 00 00 00 00 00 00 00 85
4700:00 00 00 00 00 00 00 00 8E
4708:00 00 00 00 00 00 00 00 96
4710:00 00 00 00 00 00 00 00 9E
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4720:00 00 00 00 A9 84 8D 9E C7
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4750:33 A9 13 8D 5D 1E A9 3E 13
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4760:A9 34 8D 31 2C A9 3E 8D A7
4768:32 2C A9 20 8D 6C 2C A9 72
4770:3B 8D 6D 2C A9 3E 8D 6E 40
4778:2C A9 4C 8D 6F 2C A9 77 E0
4780:8D 70 2C A9 2C 8D 71 2C B8
4788:4C 96 47 91 FD 20 61 3E 56
4790:90 08 C8 4C 77 2C A0 00 F4
4798:B9 8B 47 99 88 2C C8 C0 B0
47A0:0B D0 F5 A9 20 8D 97 2C D4
47A8:A9 8D 8D 98 2C A9 3E 8D BC
47B0:99 2C A9 20 8D A1 2C A9 43
47B8:97 8D A2 2C A9 3E 8D A3 92
47C0:2C A9 20 8D A7 2C A9 CC BA
47C8:8D A8 2C A9 3E 8D A9 2C 10
47D0:A9 20 8D AD 2C A9 DA 8D 14
47D8:AE 2C A9 3E 8D AF 2C A9 10
47E0:0E 8D C6 2C A9 3F 8D C7 A2
47E8:2C A9 20 8D CD 2C A9 18 5F
47F0:8D CE 2C A9 3F 8D CF 2C 16
47F8:A9 20 8D D4 2C A9 2F 8D 57
4800:D5 2C A9 3F 8D D6 2C A9 79
4808:20 8D E1 2C A9 36 8D E2 2F
4810:2C A9 3F 8D E3 2C A9 4C 51
4818:8D A2 2D A9 4F 8D A3 2D 7D
4820:A9 3F 8D A4 2D A9 4C 8D 87
4828:3B 2D A9 B2 8D 3C 2D A9 63
4830:3F 8D 3D 2D A9 7C 8D 38 D0
4838:2F A9 42 8D 39 2F A9 EA B0
4840:8D 1E 2F 8D 42 2F 8D 32 F9
4848:2F A9 AA 8D 6C 2F A9 43 BF
4850:8D 6D 2F A9 4C 8D 0D 2E 64
4858:A9 5F 8D 0E 2E A9 2F 8D 2C
4860:0F 2E 4C 79 48 20 F6 44 1A
4868:C4 54 F0 1F B1 FD 30 1C 82
4870:20 F2 2A 20 8F 32 4C 16 09
4878:32 A0 00 B9 65 48 99 F8 5E
4880:31 C8 C0 14 D0 F5 4C A0 CC
4888:48 20 47 45 EA C8 4C FB 91
4890:31 60 8C 8D 35 29 7F 8D 17
4898:8E 35 20 F2 2A 4C 73 45 9F
48A0:A0 00 B9 89 48 99 16 32 58
48A8:C8 C0 17 D0 F5 A9 7E 8D 9E
48B0:CF 2D A9 50 8D 69 26 A9 B6
48B8:83 8D 5B 26 A9 6D 8D 69 C3
48C0:27 A9 A5 8D FC 27 A9 0C C0
48C8:8D FD 27 A9 E8 8D FE 27 C1
48D0:A9 4C 8D 1A 23 A9 1D 8D 24
48D8:1B 23 A9 23 8D 1C 23 A9 F3
48E0:4E 8D 7E 1C A9 3B 8D 7F 62
48E8:1C 60 00 00 00 00 00 00 9F
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Cocaine can make you blind.

Cocaine fools your brain.

When you first use it, you may feel more alert, more confident, more sociable, more in control of your life.

In reality, of course, nothing has changed. But to your brain, the feeling seems real.

From euphoria...

You want to experience it again. So you do some more coke.

Once more, you like the effects. It's a very clean high. It doesn't really feel like you're drugged. Only this time, you notice you don't feel so good when you come down. You're confused, edgy, anxious, even depressed.

Fortunately, that's easy to fix. At least for the next 20 minutes or so. All it takes is another few lines, or a few more hits on the pipe.

You're discovering one of the things that makes cocaine so dangerous.

It compels you to keep on using it. (Given unlimited access, laboratory monkeys take cocaine until they have seizures and die.)

If you keep experimenting with cocaine, quite soon you may feel you need it just to function well. To perform better at work, to cope with stress, to escape depression, just to have a good time at a party or a concert.

Like speed, cocaine makes you talk a lot and sleep a little. You can't sit still. You have difficulty concentrating and remembering. You feel aggressive and suspicious towards people. You don't want to eat very much. You become uninterested in sex.

To paranoia...

Compulsion is now definitely addiction. And there's worse to come.

You stop caring how you look or how you feel. You become paranoid. You may feel people are persecuting you, and you may have an intense fear that the police are waiting to arrest you. (Not surprising, since cocaine is illegal.)

You may have hallucinations. Because coke heightens your senses, they may seem terrifyingly real.

As one woman overdosed, she heard laughter nearby and a voice that said, "I've got you now." So many people have been totally convinced that bugs were crawling on or out of their skin, that the hallucination has a nickname: the coke bugs.

Especially if you've been smoking cocaine, you may become violent, or feel suicidal.

When coke gets you really strung out, you may turn to other drugs to slow down. Particularly downers like alcohol, tranquilizers, marijuana and heroin. (A speedball—heroin and cocaine—is what killed John Belushi.)

If you saw your doctor now and he didn't know you were using coke, he'd probably diagnose you as a manic-depressive.

To psychosis...

Literally, you're crazy.

But you know what's truly frightening? Despite everything that's happening to you, even now, you may still feel totally in control.

That's the drug talking. Cocaine really does make you blind to reality. And with what's known about it today, you probably have to be something else to start using coke in the first place.

Dumb.

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Partnership for a Drug-Free America

How To Type In *COMPUTE!'s Gazette* Programs

Each month, COMPUTE!'s Gazette publishes programs for the Commodore 128, 64, Plus/4, and 16. Each program is clearly marked by title and version. Be sure to type in the correct version for your machine. All 64 programs run on the 128 in 64 mode. Be sure to read the instructions in the corresponding article. This can save time and eliminate any questions which might arise after you begin typing.

We frequently publish two programs designed to make typing easier: The Automatic Proofreader, and MLX, designed for entering machine language programs.

When entering a BASIC program, be especially careful with DATA statements as they are extremely sensitive to errors. A mistyped number in a DATA statement can cause your machine to "lock up" (you'll have no control over the computer). If this happens, the only recourse is to turn your computer off then on, erasing what was in memory. So be sure to *save a program before you run it.* If your computer crashes, you can always reload the program and look for the error.

Special Characters

Most of the programs listed in each issue contain special control characters. To facilitate typing in any programs from the *Gazette*, use the following listing conventions.

The most common type of control characters in our listings appear as words within braces: {DOWN} means to press the cursor down key; {5 SPACES} means to press the space bar five times.

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing another key), the character is underlined. For example, A means hold down the SHIFT key and press A. You may see strange characters on your screen, but that's to be expected. If you find a number followed by an underlined key enclosed in braces (for example, {8 A}), type the key as many times as indicated (in our example, enter eight SHIFTed A's).

If a key is enclosed in special brackets, [ ], hold down the Commodore key (at the lower left corner of the keyboard) and press the indicated character.

Rarely, you'll see a single letter of the alphabet enclosed in braces. This can be entered on the Commodore 64 by pressing the CTRL key while typing the letter in braces. For example, {A} means to press CTRL-A.

The Quote Mode

Although you can move the cursor around the screen with the CRSR keys, often a programmer will want to move the cursor under program control. This is seen in examples such as {LEFT}, and {HOME} in the program listings. The only way the computer can tell the difference between direct and programmed cursor control is *the quote mode.*

Once you press the quote key, you're in quote mode. This mode can be confusing if you mistype a character and cursor left to change it. You'll see a reverse video character (a graphics symbol for cursor left). In this case, you can use the DELete key to back up and edit the line. Type another quote and you're out of quote mode. If things really get confusing, you can exit quote mode simply by pressing RETURN. Then just cursor up to the mistyped line and fix it. **G**

When You Read:	Press:	See:
{CLR}	SHIFT + CLR/HOME	
{HOME}	CLR/HOME	
{UP}	SHIFT + ↑ CRSR ↓	
{DOWN}	↑ CRSR ↓	
{LEFT}	SHIFT + ← CRSR →	
{RIGHT}	← CRSR →	
{RVS}	CTRL + 9	
{OFF}	CTRL + 0	
{BLK}	CTRL + 1	
{WHT}	CTRL + 2	
{RED}	CTRL + 3	
{CYN}	CTRL + 4	

When You Read:	Press:	See:
{PUR}	CTRL + 5	
{GRN}	CTRL + 6	
{BLU}	CTRL + 7	
{YEL}	CTRL + 8	
{ F1 }	f1	
{ F2 }	SHIFT + f1	
{ F3 }	f3	
{ F4 }	SHIFT + f3	
{ F5 }	f5	
{ F6 }	SHIFT + f5	
{ F7 }	f7	
{ F8 }	SHIFT + f7	

When You Read:	Press:	See:
←	←	
↑	SHIFT + ↑	

For Commodore 64 Only

When You Read:	Press:	See:
[1]	COMMODORE + 1	
[2]	COMMODORE + 2	
[3]	COMMODORE + 3	
[4]	COMMODORE + 4	
[5]	COMMODORE + 5	
[6]	COMMODORE + 6	
[7]	COMMODORE + 7	
[8]	COMMODORE + 8	

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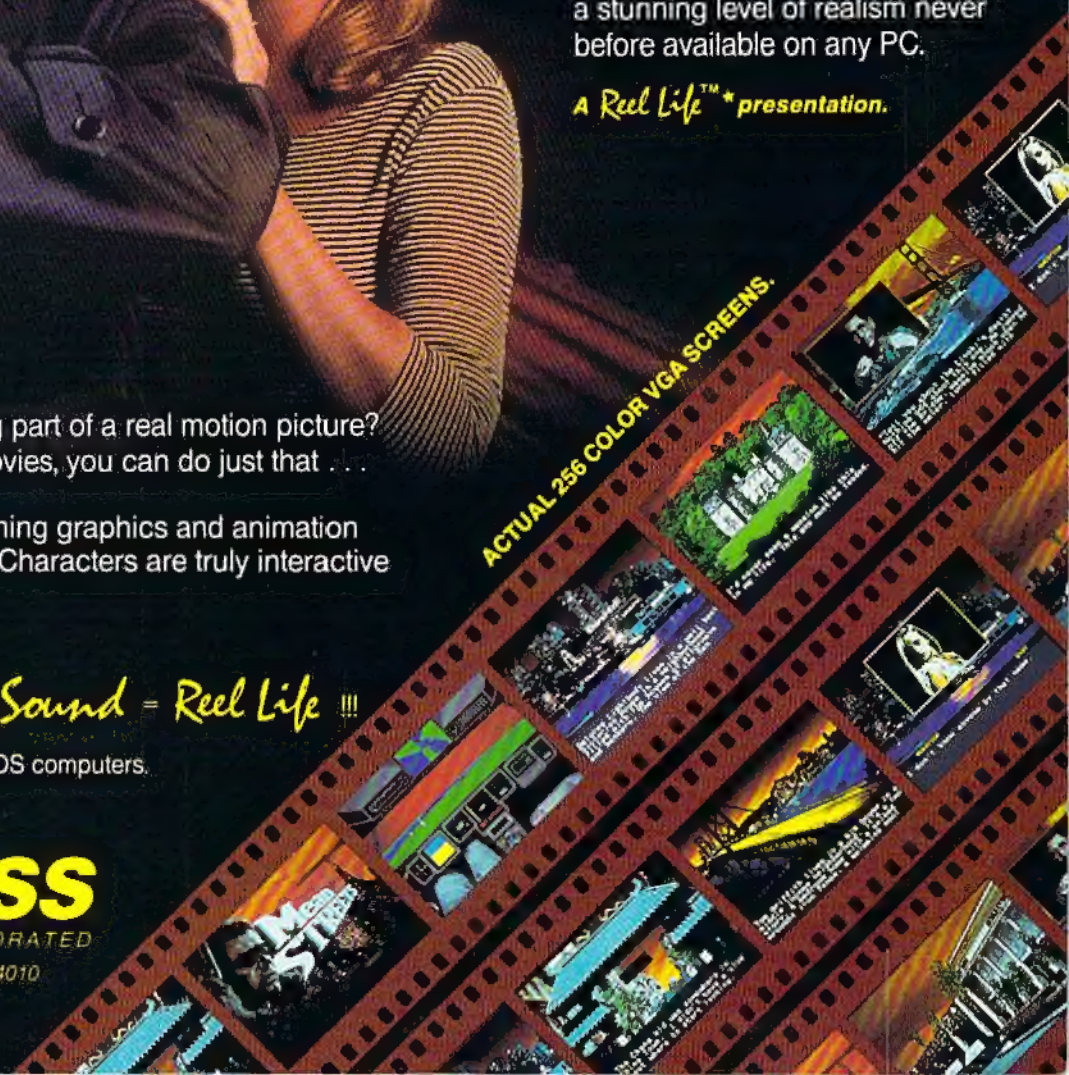

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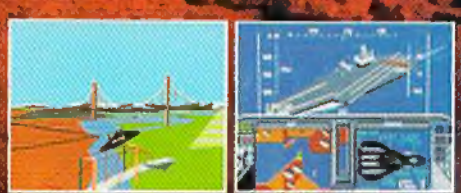

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